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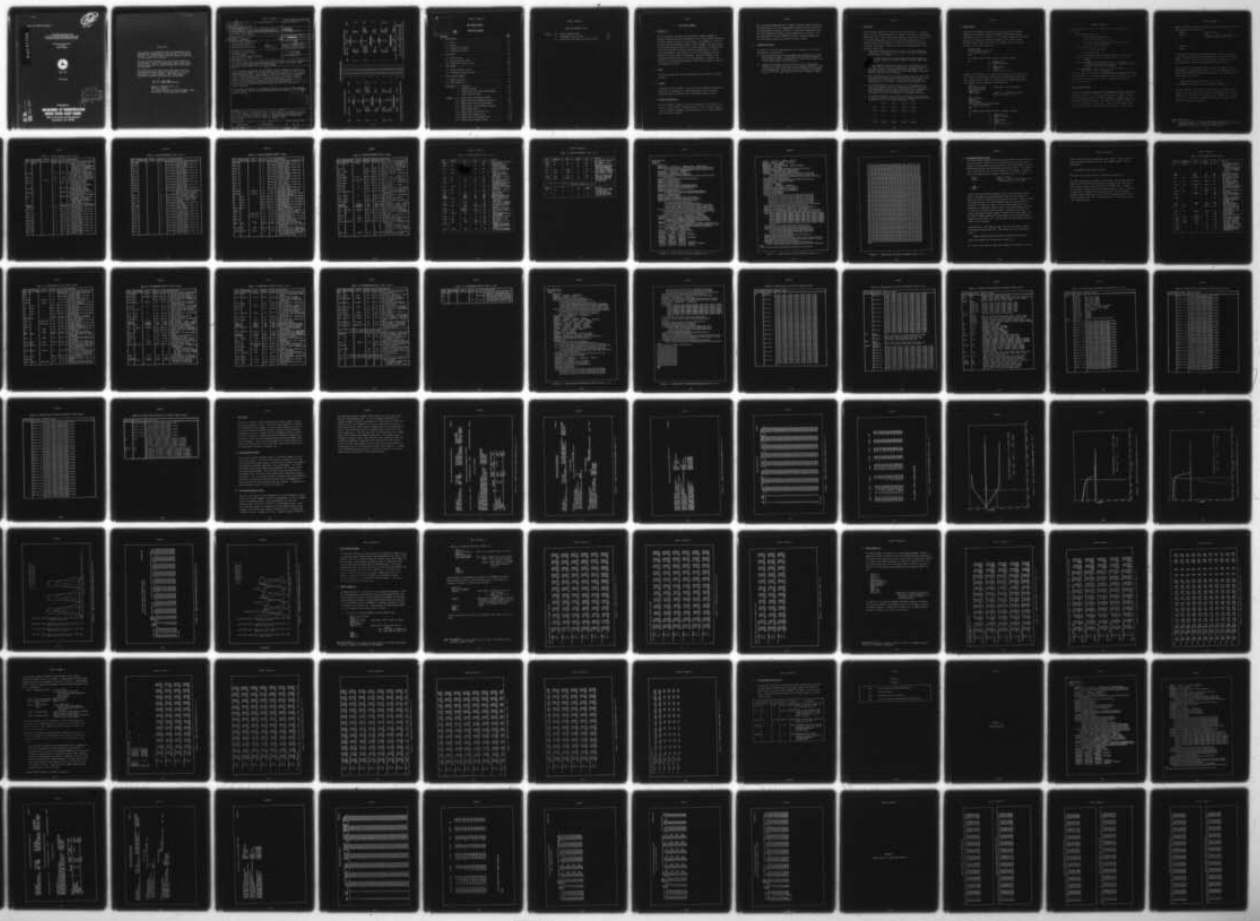

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July 1977

COMPUTER PROGRAM FOR DESIGN AND PERFORMANCE ANALYSIS OF NAVIGATION-AID POWER SYSTEMS

Program Documentation
Volume II
User's Manual

July 1977

Final Report

Prepared for

DEPARTMENT OF TRANSPORTATION
UNITED STATES COAST GUARD
Office of Research and Development
Washington, D.C. 20590

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D. L. Birkimer

DONALD L. BIRKIMER, Ph.D., P.E.
Technical Director
U.S. Coast Guard Research and Development Center
Avery Point, Groton, Connecticut 06340

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16. Abstract

The Jet Propulsion Laboratory has developed a computer program for designing and analyzing the performance of solar array/battery power systems for the U.S. Coast Guard Navigational Aids. This program is called the Design Synthesis/Performance Analysis (DSPA) Computer Program. The basic function of the Design Synthesis portion of the DSPA program is to evaluate functional and economic criteria to provide specifications for viable solar array/battery power systems. The function of the Performance Analysis portion of the DSPA program is to simulate the operation of solar array/battery power systems under specific loads and environmental conditions.

This document provides all the information necessary to access the DSPA programs, to input required data and to generate appropriate Design Synthesis or Performance Analysis Output.

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METRIC CONVERSION FACTORS

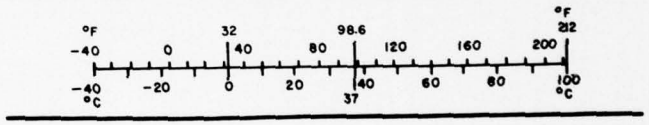
Approximate Conversions to Metric Measures

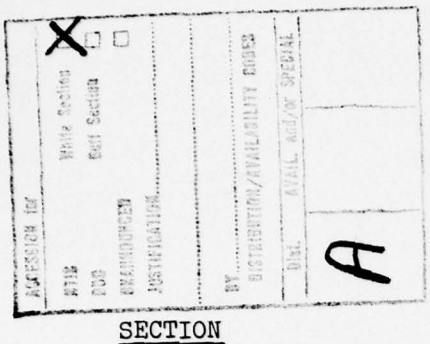
Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
in	inches	*2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
		AREA		
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
		MASS (weight)		
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
		VOLUME		
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
		TEMPERATURE (exact)		
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

*1 in = 2.54 (exactly). For other exact conversions and more detailed tables, see NBS Misc. Publ. 286, Units of Weights and Measures, Price $2.25, SD Catalog No. C13.10:286.

Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
		LENGTH		
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
		AREA		
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
		MASS (weight)		
g	grams	0.035	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
		VOLUME		
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
		TEMPERATURE (exact)		
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F





DSPA USER'S MANUAL

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DSPA USER'S MANUAL

1. INTRODUCTION

The Jet Propulsion Laboratory has developed a computer program for designing and analyzing the performance of solar array/battery Navigation Aid Power Systems for the U.S. Coast Guard. This program is called the Design Synthesis/Performance Analysis (DSPA) program. The basic function of the Design Synthesis portion of the DSPA program is to evaluate functional and economical criteria to provide specifications for viable solar array/battery power systems for use in the flashing lamp buoys employed as Maritime Aids to Navigation. The basic function of the Performance Analysis portion of the DSPA program is to simulate the operation of solar array/battery power systems under specific loads and environmental conditions.

1.1 Scope

The User's Manual gives a detailed description of the use of the DSPA programs.

1.2 Purpose

The purpose of this document is to provide all information necessary to access the DSPA programs, to input required data, and to generate appropriate Design Synthesis and/or Performance Analysis output.

1.3 Computer Requirements

The DSPA Computer Program is currently programmed for the UNIVAC 1108 computer using the EXEC 8 Operating System. Since the DSPA program is coded in FORTRAN V language, the program may be run on other computers with minimal modification.

Use of the DSPA program requires a computer having at least 30,000 core locations available for the program and at least 2 tape units available for mount/dismount service in addition to the normal input/output units. The core requirement is based on using segmentation or overlay. Software requirements include a FORTRAN V compiler, standard mathematical and input/output routines and CALCOMP plotting routines.

1.4 Program Flow Charts

Flow charts of the DSPA subprograms were not furnished in the Program Documentation volumes since:

- Most computer facilities have programs which automatically produce subroutine flow charts. If such charts are desired, the program user can easily select the subroutine of interest and obtain a copy of the latest version of the subroutine.

- Preparation, reproduction, and inclusion of all of the present versions of the DSPA subroutines in the Program Documentation would be more costly than if the flow charts are prepared by the program user automatically. Additionally, these flow charts would become obsolete as modifications were made to the DSPA computer program.

2. DSPA INPUT

Use of the DSPA program will require three forms of input: (1) control cards to direct program execution, (2) namelist data, and (3) time-variant free-format data. Each of these forms depends on the portion (or portions) of the DSPA program which is to be utilized for a particular run as described later in this section. Certain conventions have been established and used wherever possible to provide some simplification with regards to input data:

a. Free-format input data consists of a list of values separated by commas (e.g., 1975.,98.,12.,,1.0,2.8,0,); if an item is omitted, the value zero is assumed.

b. Namelist input consists of variable names with their values (e.g., ACELL = 4.0,); arrays are filled with zeroes wherever values are not entered.

c. Automatic typing of variables is used (i.e., the letters "I", "J", "K", "L", "M", and "N" at the beginning of a variable name denote an integer variable, while all other letters indicate a real variable type) with the exception of MAXI, MAXV, MARSA, and MSAPWR which are defined as real variables.

d. Multi-dimensional arrays follow the convention that the first index will vary most rapidly, then the second, and so on; e.g., for the variable A(2,2), inputting A = 1.0,2.0,3.0,4.0 is the same as entering A(1,1) = 1.0, A(2,1) = 2.0, A(1,2) = 3.0, A(2,2) = 4.0.

e. An array described as "X as a function of Y" and dimensioned as A(N,2) will have the values of Y entered beginning at A(1,1) and the corresponding X values input beginning at A(1,2); exceptions to this convention are the variables AD1 and AD2 which have the independent (Y) values entered after the dependent (X) values.

f. An array described as "Z as a function of X and Y" and dimensioned as A(N,M) vs. X(N) and Y(M) will have the Z values entered for each Y value for the set of X values beginning at A(1,m):

	X(1)	X(2)	X(3)	...	X(n)
Y(1)	A(1,1)	A(2,1)	A(3,1)	...	A(N,1)
Y(2)	A(1,2)	A(2,2)	A(3,2)	...	A(N,2)
.	.	.	.		.
.	.	.	.		.
.	.	.	.		.
Y(M)	A(1,M)	A(2,M)	A(3,M)	...	A(N,M)

2.1 Control Cards

There are two different procedures for executing the DSPA program, depending on the manner in which the ambient temperature and solar insolation data is to be obtained. If the subject temperature/insolation data is to be input by the user via namelist in the form of time-dependent tables (DTAMB1 and DTTA1), the commands required to cause execution of the DSPA program are:

```
@XQT DSPA.DSPA
[IPRG],0,[DEBUG],[XLN],[YLN]
     [User Input Data]
@EØF
```

Are Summary Output Tables Desired? [computer request]

NØ	@@ASG,UP P1. @@BRKPT PRINT$/P1 YES @BRKPT PRINT$ @FREE P1. @SYM P1,,[site I.D.]

However, if the program is to obtain the temperature and insolation data for a specific day and hour from either a National Oceanic and Atmospheric Administration (NOAA) or a statistically prepared weather tape, the necessary control commands for execution are:

```
@ASG,T 12
@ASG,T TAPE,T,xxxxR          where xxxx = tape reel number
@MSG READ TAPE xxxx
@REWIND TAPE
[@MØE TAPE,n]                where n + 1 = position of desired
                             data file on tape (n ≥ 1)

@CØPY,G TAPE,12
@FREE TAPE
@XQT DSPA.DSPA
[IPRG],[ITAPE],[DEBUG],[XLN],[YLN]
     [User Input Data]
@EØF
```

Are Summary Output Tables Desired? [computer request]

NØ	@@ASG,UP P1. @@BRKPT PRINT$/P1 YES @BRKPT PRINT$ @FREE P1. @SYM P1,,[site I.D.]

The input parameters IPRG, ITAPE, DEBUG, XLN and YLN are defined as follows:

IPRG = Program Selector:

0 means Design Synthesis only,

1 means Performance Analysis only,

2 means both Design Synthesis and Performance Analysis programs are to be executed

ITAPE = Weather Data Input Selector

-1 = statistical input tape

0 = user input data

YYDDD = MERGE tape input beginning at year = YY and day = DDD

DEBUG = Debug printout start time (DDD + HH/24), or 0.0 if not desired

XLN = the length of the horizontal plot axis (in inches) for the Performance Analysis summary plots; no summary plots are produced if XLN is zero or negative

YLN = the length of the vertical plot axis (in inches) for the Performance Analysis summary plots

The "User Input Data" consists of the Design Synthesis namelist and free-format data and/or the Performance Analysis namelist and free-format data as required by the input value of IPRG. A sample DSPA runstream is included in Appendix B.

2.2 Design Synthesis Input

A listing of the Design Synthesis input variables with their description is provided in Table 2-1. As indicated, there are two types of inputs to the Design Synthesis portion of the DSPA program: namelist input and free-format time-variant input. The namelist input data is entered only once at the beginning of the program. Column 1 of each namelist data card must be blank (i.e., data must begin in column 2, or later) and

columns 73-80 must be blank. Formatting of the Design Synthesis namelist input data cards is as follows:

```
b$INPUT                    where b = blank
bAAA=...,                  where AAA ... ZZZ are the names of the
                             input variables (in any order)
  .
  .
  .
bZZZ=zzz,
b$END
```

All namelist input data is initially assigned a default value of zero unless otherwise specified by the program (see Table 2-1 for non-zero values). If the user does not assign a value to a namelist variable, the program will assume the default value for that variable.

Following entry of the namelist data, the user will input a series of free-format, time-variant data cards (1 to 52 cards depending on which weeks of the year are of interest to the user). The format of each of these cards is as follows:

NWEEK,CT(1),TC(1),CT(2),TC(2),...,CT(7),TC(7),

where NWEEK,CT(i), and TC(i) are as described in Table 2-1.

All seven pairs of CT/TC data must be input for each value of NWEEK entered. The last card in this series of time-variant data may be an "@EØF" card or may specify an illegal value for NWEEK (i.e., greater than 52.0). A sample set of input for executing the Design Synthesis routine is provided in Figure 2-1.

NOTE: If the user wishes to utilize nickel-cadmium battery data (see DSPA Programmer's Manual for listing), an "@ADD DSPA.BLKDTA/NI-CD" statement must be included as part of the "User Input Data."

TABLE 2-1.-DESIGN SYNTHESIS INPUT

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
AA	(21,5,5)	-	TABLE 2-3	REAL	TABLE OF BATTERY EFFICIENCY VS. STATE-OF-CHARGE, CURRENT, AND TEMPERATURE: 21 VALUES OF EFFICIENCY VS. 'SOC' STATE-OF-CHARGE DATA AT EACH OF 5 'BI' CURRENTS FOR EACH OF 5 'TP' TEMPERATURES
ACELL	-	SQ.CM	0.0	REAL	AREA OF A SINGLE SOLAR CELL
ACSTD	-	SQ.CM	4.0	REAL	STANDARD SOLAR CELL AREA USED FOR 'XII' VS. 'VV' TABLE
BETAB	(16,8)	MILLIVOLTS/°C	TABLE 2-3	REAL	TABLE OF SOLAR CELL OPEN CIRCUIT VOLTAGE VS. CELL TEMPERATURE AND SOLAR INSOLATION
BI	(5)	AMPS	TABLE 2-3	REAL	TABLE OF REFERENCE CURRENTS FOR 'AA'
BRCEST	-	AMPS	0.0	REAL	ESTIMATED NORMALIZED BATTERY CHARGE CURRENT
BRCHMX	-	AMPS	0.0	REAL	MAXIMUM ALLOWABLE NORMALIZED BATTERY CHARGE CURRENT
ERDEST	-	AMPS	0.0	REAL	ESTIMATED NORMALIZED BATTERY DISCHARGE CURRENT
BRDSTD	-	AMPS	0.0	REAL	STANDARD NORMALIZED BATTERY DISCHARGE CURRENT
BTEMP	(16)	°C	TABLE 2-3	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'BETAB'
CBAVAL	(30)	AMP-HOURS	0.0	REAL	TABLE OF AVAILABLE STORAGE CELL CAPACITIES, FROM A GIVEN MANUFACTURER, IN INCREASING ORDER OF SIZE
CBMAX	-	AMP-HOURS	0.0	REAL	MAXIMUM DESIRED CAPACITY OF THE INDIVIDUAL BATTERIES
CDECA	-	%	0.0	REAL	SOLAR ARRAY CURRENT DEGRADATION FACTOR DUE TO FABRICATION LOSSES
CDECB	-	%	0.0	REAL	SOLAR ARRAY CURRENT DEGRADATION FACTOR DUE TO TERRESTRIAL PERFORMANCE EXTRAPOLATION UNCERTAINTY
CELPAC	-	-	0.0	REAL	SOLAR CELL PACKING FACTOR ON SOLAR ARRAY
CLR	-	AMPS	0.0	REAL	LAMP CURRENT RATING
CLSIT	(6)	AMPS	TABLE 2-3	REAL	TABLE OF REFERENCE LAMP CURRENT RATINGS FOR CLST
CLST	(6,7)	-	TABLE 2-3	REAL	TABLE OF COLD FILAMENT LAMP SURGE COEFFICIENT VS. LAMP CURRENT RATING AND INITIAL FLASH DURATION
CLSTT	(7)	SECONDS	TABLE 2-3	REAL	TABLE OF REFERENCE LAMP FLASH DURATIONS FOR CLST
CN	-	-	0.0	REAL	CLEARNESS NUMBER
CURZ	(10,2)	WATTS,AMPS	0.0	REAL	TABLE OF ZENER DIODE CURRENT VS. MAXIMUM HEAT DISSIPATION
DODAT	(10,2)	SQ.FT,DOLLARS	0.0	REAL	TABLE OF SOLAR ARRAY SPECIFIC COST VS. SOLAR ARRAY AREA
DODCHT	(10,10)	DOLLARS	0.0	REAL	TABLE OF BATTERY CHARGER SPECIFIC COST VS. MAXIMUM BATTERY CHARGER LOAD AND QUANTITY TO BE PROCURED

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
DCDCNT	(10)	-	0.0	REAL	TABLE OF REFERENCE PROCUREMENT QUANTITIES FOR 'DCDCHT'
DCDCPT	(10)	WATTS	0.0	REAL	TABLE OF REFERENCE BATTERY CHARGER LOADS FOR 'DCDCHT'
DCDCT	(10)	AMP-HOURS	0.0	REAL	TABLE OF REFERENCE BATTERY CAPACITIES FOR 'DCDET'
DCDST	(10,10)	DOLLARS	0.0	REAL	TABLE OF BATTERY SPECIFIC COST VS. BATTERY CAPACITY AND QUANTITY TO BE PROCURED
DCDNNT	(10,2)	-	0.0	REAL	TABLE OF REFERENCE ZENER DIODE QUANTITIES FOR 'DCDNZT'
DCDNPT	(10,2)	WATTS	0.0	REAL	TABLE OF REFERENCE ZENER DIODE POWER LEVELS FOR 'DCDNZT'
DCDNT	(10)	-	0.0	REAL	TABLE OF REFERENCE PROCUREMENT QUANTITIES FOR 'DCDET'
DCDNZT	(10,10,2)	DOLLARS	0.0	REAL	TABLE OF ZENER DIODE SPECIFIC COST VS. POWER LEVEL, QUANTITY TO BE PROCURED, AND ZENER TYPE (1 OR 2)
DCDPNT	(10)	-	0.0	REAL	TABLE OF REFERENCE PROCUREMENT QUANTITIES FOR 'DCDPST'
DCDPPT	(10)	WATTS	0.0	REAL	TABLE OF REFERENCE POWER LEVELS FOR 'DCDPST'
DCDPST	(10,10)	DOLLARS	0.0	REAL	TABLE OF SHUNT LIMITER SPECIFIC COST VS. LOAD AND QUANTITY TO BE PROCURED
DODT	(10,2)	[LN,DOD]	0.0	REAL	TABLE OF BATTERY DEPTH OF DISCHARGE VS. NATURAL LOGARITHM OF BATTERY CYCLE REQUIREMENTS
DTAMB1	(25,2)	HOURS,°F	0.0	REAL	TABLE OF HOURLY TEMPERATURE VARIATION VS. TIME OF DAY
DTTA1	(366,2)	DAYS,°F	0.0	REAL	TABLE OF DAILY TEMPERATURE VARIATION VS. DAY OF YEAR
DTTESG	-	°F	0.0	REAL	ENERGY STORAGE GROUP EQUIPMENT TEMPERATURE RISE
DTTPCD	-	°F	0.0	REAL	POWER CONDITIONING/DISTRIBUTION GROUP TEMPERATURE RISE
DTTPSG	-	°F	0.0	REAL	POWER SOURCE GROUP EQUIPMENT TEMPERATURE RISE
DURAM	-	YEARS	0.0	REAL	DURATION OF MISSION
DWDAT	(10,2)	SQ.FT,POUNDS	0.0	REAL	TABLE OF SOLAR ARRAY SPECIFIC WEIGHT VS. SOLAR ARRAY AREA
DWDCHT	(10,2)	WATTS,POUNDS	0.0	REAL	TABLE OF BATTERY CHARGER SPECIFIC WEIGHT VS. MAXIMUM BATTRY CHARGER LOAD
DWDET	(10,2)	AMP-HRS,POUNDS	0.0	REAL	TABLE OF BATTRY SPECIFIC WEIGHT VS. BATTERY CAPACITY
DWDNZT	(10,2,2)	WATTS,POUNDS	0.0	REAL	TABLE OF ZENER DIODE SPECIFIC WEIGHT VS. POWER LEVEL AND ZENER TYPE (1 OR 2)
DWDFST	(10,2)	WATTS,POUNDS	0.0	REAL	TABLE OF SHUNT LIMITER SPECIFIC WEIGHT VS. POWER LEVEL

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
FA	(7,5)	-	TABLE III	REAL	SOLAR RADIATION FOURIER COEFFICIENTS, 7 EACH FOR: SOLAR DECLINATION ANGLE EQUATION OF TIME DIFFERENCE APPARENT SOLAR CONSTANT ATMOSPHERIC EXTINCTION FCTR SKY DIFFUSE FACTOR
FRCELL	-	-	0.0	REAL	BIASING FACTOR FOR SELECTING THE NUMBER OF STORAGE CELLS IN SERIES IN THE BATTERIES
HDER	-	-	0.0	REAL	HEAT DISSIPATION DERATING FACTOR FOR A SINGLE ZENER DIODE
HDZMX	-	WATTS	0.0	REAL	MAXIMUM HEAT DISSIPATION FOR A SINGLE ZENER DIODE
ICHRT	-	-	0	INTEGER	BATTERY CHARGER TYPE: 0=NO CHARGER PRESENT 1=CONSTANT VOLTAGE CHARGER WITH CURRENT LIMIT
IFTYPE	-	-	0	INTEGER	FLASHER PATTERN TYPE: 0=NON-STANDARD PATTERN 1-15=STANDARD PATTERNS
INDFLS	-	-	0	INTEGER	LAMP FLASHER CONDITION FLAG: 0=LAMP FLASHER OFF 1=LAMP FLASHER ON (FLASHING)
ISH	-	-	0	INTEGER	SHUNT LIMITER TYPE: 0=NO SHUNT LIMITER PRESENT 1=ORDINARY ZENER DIODE 2=TEMPERATURE-COMPENSATED ZENER DIODE 3=ACTIVE SHUNT LIMITER
NBATP	-	-	0	INTEGER	NO. OF BATTERIES TO BE PROCURED
NBTEMP	-	-	16	INTEGER	NO. OF VALID DATA POINTS FOR 'BTEMP' TABLE
NCDEG	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'SADEGC' TABLE
NCURZ	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'CURZ' TABLE
NDCDA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDAT' TABLE
NDCDC	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDCT' TABLE
NDCDCN	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDCNT' TABLE
NDCDCP	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDCPT' TABLE
NDCDN	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDNT' TABLE
NDCDNN	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDNNT' TABLE
NDCDNP	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDNPT' TABLE

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
NDCDPN	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDPNT' TABLE
NDCDPP	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDPPT' TABLE
NDOD	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DCDT' TABLE
NDTAMB	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DTAMB1' TABLE
NDTTA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DTTA1' TABLE
NDWDA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DWDAT' TABLE
NDWDCH	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DWDCHT' TABLE
NDWDE	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DWDET' TABLE
NDWDNZ	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DWDNZT' TABLE
NDWDPS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DWDPST' TABLE
NPREQ	-	-	0	INTEGER	NO. OF SOLAR CELLS IN PARALLEL REQUIRED FOR EACH SOLAR CELL ARRAY ELECTRICAL SECTION
NROE	-	-	23	INTEGER	NO. OF VALID DATA POINTS FOR 'ROE', 'SUNLIT' TABLES
NRSCEL	-	-	26	INTEGER	NO. OF VALID DATA POINTS FOR 'RSCELL', 'TEMTAB' TABLES
NSAP	-	-	0	INTEGER	NO. OF SOLAR ARRAYS TO BE PROCURED
NSOC	-	-	21	INTEGER	NO. OF VALID DATA POINTS FOR 'SOC' TABLE
NSUNMW	-	-	8	INTEGER	NO. OF VALID DATA POINTS FOR 'SUNMW' TABLE
NTCZT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'TCZTT' TABLE
NTCZV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'TCZVT' TABLE
NVCHIS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHIST' TABLE
NVCHIO	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHIOT' TABLE
NVCHT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHTT' TABLE
NVCHV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHVT' TABLE
NVDEG	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'SADEGV' TABLE
NVLBT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VLBTT' TABLE
NVLBV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VLBVT' TABLE

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
NVRISA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VRISAT' TABLE
NVRIO	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VRIOT' TABLE
NXIHT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'XIHTT' TABLE
NXIHV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'XIHVT' TABLE
NZDT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZDIMPT' TABLE
NZDV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZDIMPV' TABLE
NZRA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZRAT' TABLE
NZRS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZRST' TABLE
NZSH	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZSHTAB' TABLE
NZTC	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZTCOEF' TABLE
PHIAAD	-	DEGREES	0.0	REAL	SOLAR ARRAY SURFACE AZIMUTH ANGLE FROM THE SOUTH
PHIAID	-	DEGREES	0.0	REAL	SOLAR ARRAY SURFACE TILT ANGLE FROM THE HORIZONTAL
P0	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P1	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P2	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P3	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
QBATT	(21)	-	TABLE III	REAL	TABLE OF REFERENCE STATES-OF-CHARGE FOR 'VBATT'
QBRES	-	-	0.0	REAL	BATTERY RESERVE AS A FRACTION OF TOTAL STATE-OF-CHARGE
QOFF	-	WATTS/SQ.M	0.0	REAL	SOLAR INSOLATION LEVEL FOR LAMP FLASHER TURN-OFF
QON	-	WATTS/SQ.M	0.0	REAL	SOLAR INSOLATION LEVEL FOR LAMP FLASHER TURN-ON
REFLH	-	-	0.0	REAL	HORIZONTAL SURFACE REFLECTIVITY FOR SOLAR RADIATION
RLL	-	OHMS	0.0	REAL	USER LOAD CABLE RESISTANCE
SOE	(23)	%	TABLE III	REAL	TABLE OF SOLAR CELL I-V CURVE CORRECTION FACTORS VS. SOLAR INSOLATION
RSCELL	(26)	OHMS	TABLE III	REAL	TABLE OF SOLAR CELL SERIES RESISTANCE VS. CELL TEMPERATURE
SADEC	(36,2)	DAYS,%	0.0	REAL	TABLE OF SOLAR ARRAY INPUT CURRENT DEGRADATION FACTORS DUE TO THE ENVIRONMENT VS. DAYS SINCE START OF TEST

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
SADEGV	(36,2)	DAYS,%	0.0	REAL	TABLE OF SOLAR ARRAY OPEN CIRCUIT VOLTAGE DEGRADATION FACTORS DUE TO THE ENVIRONMENT VS. DAYS SINCE START OF TEST
SARES	-	-	0.0	REAL	SOLAR ARRAY RESERVE AS A FRACTION OF THE TOTAL AREA
SOC	(21)	-	TABLE IDI	REAL	TABLE OF REFERENCE STATES-OF-CHARGE FOR 'AA'
SPECOR	-	-	0.0	REAL	SOLAR CELL SPECTRAL CORRECTION FACTOR
SUNLIT	(23)	WATTS	TABLE IDI	REAL	TABLE OF REFERENCE SOLAR INSOLATION VALUES FOR 'RCE'
SUNMW	(8)	MILLIWATTS	TABLE IDI	REAL	TABLE OF REFERENCE SOLAR INSOLATION VALUES FOR 'SETAE'
TBATT	(6)	°F	TABLE IDI	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'VBATT'
TBDSTD	-	°F	0.0	REAL	STANDARD BATTERY DISCHARGE TEMPERATURE
TCSTD	-	°C	60.0	REAL	STANDARD SOLAR CELL TEMPERATURE USED FOR 'XII' VS. 'VV' TABLE
TCZIV	(10,10)	-	0.0	REAL	TABLE OF ZENER DIODE CURRENT RATIO VS. VOLTAGE RATIO AND TEMPERATURE
TCZT	(10)	°C	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'TCZIV'
TCZV	(10)	-	0.0	REAL	TABLE OF REFERENCE VOLTAGE RATIOS FOR 'TCZIV'
TEMTAB	(26)	°C	TABLE IDI	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'RSCELL'
THELAD	-	DEGREES	0.0	REAL	BUOY LATITUDE: +NORTH, -SOUTH
THELOD	-	DEGREES	0.0	REAL	BUOY LONGITUDE: +WEST, -EAST
TLLS	(16)	SECONDS	0.0	REAL	TABLE OF NON-STANDARD FLASHER PATTERNS (TIMES ON/OFF)
TLO	(16,15)	SECONDS	TABLE IDI	REAL	TABLE OF STANDARD FLASHER PATTERNS (ON/OFF) VS. 'IFTYPE'
TP	(5)	°F	TABLE IDI	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'AA'
TTAVE	-	°F	0.0	REAL	AVERAGE YEARLY TEMPERATURE AT SELECTED LOCATION
TZN	-	HOURS	0.0	REAL	TIME ZONE NUMBER (HOURS BEHIND GREENWICH MEAN TIME)
VBATT	(3,21,6)	VOLTS	TABLE IDI	REAL	TABLE OF BATTERY VOLTAGE VS. CURRENT, STATE-OF-CHARGE, AND TEMPERATURE: 9 VALUES OF VOLTAGE VS. 'XIBATT' CURRENT AT EACH OF 21 'QBATT' STATES-OF-CHARGE FOR EACH OF 6 'TBATT' TEMPERATURES
VBUS	-	VOLTS	0.0	REAL	NOMINAL VALUE OF RAW POWER BUS OPERATING POINT VOLTAGE

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
VBUSMN	-	VOLTS	0.0	REAL	MINIMUM ALLOWABLE RAW POWER BUS OPERATING VOLTAGE
VCHIST	(10,2)	VOLTS	0.0	REAL	TABLE OF BATTERY CHARGER 'SATURATED/ACTIVE' INPUT VOLTAGE VS. TEMPERATURE
VCHIOT	(10,2)		0.0	REAL	TABLE OF BATTERY CHARGER INPUT VOLTAGE AT TURN-ON VS. TEMPERATURE
VCHIT	(10,10)		0.0	REAL	TABLE OF BATTERY CHARGER 'ACTIVE' INPUT VOLTAGE VS. CHARGER OUTPUT VOLTAGE AND TEMPERATURE
VCHIT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'VCHIT'
VCHVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE CHARGER OUTPUT VOLTAGES FOR 'VCHIT'
VDEGA	-	%	0.0	REAL	SOLAR ARRAY OPEN CIRCUIT VOLTAGE DEGRADATION FACTOR DUE TO TEMPERATURE UNCERTAINTY
VLBT	(10,10)	VOLTS	0.0	REAL	TABLE OF LAMP REGULATOR OUTPUT VOLTAGE VS. INPUT VOLTAGE AND TEMPERATURE
VLBTT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'VLBT'
VLBVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE INPUT VOLTAGES FOR 'VLBT'
VLR	-	VOLTS	0.0	REAL	LAMP VOLTAGE RATING
VMAXIV	-	VOLTS	0.0	REAL	MAXIMUM RAW POWER BUS VOLTAGE
VMINIV	-	VOLTS	0.0	REAL	MINIMUM RAW POWER BUS VOLTAGE
VRISAT	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF 'SATURATED/ACTIVE' LAMP REGULATOR VOLTAGE VS. TEMPERATURE
VRIOT	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF 'SATURATED' LAMP REGULATOR VOLTAGE VS. TEMPERATURE
VSAINC	-	VOLTS	0.0	REAL	SOLAR ARRAY VOLTAGE INCREMENT
VV	(30)	VOLTS	TABLE 2-3	REAL	TABLE OF REFERENCE SOLAR CELL VOLTAGES
XCSTD	-	MILLIWATTS/ SQ.CM	145.0	REAL	STANDARD SOLAR INTENSITY USED FOR 'XII' VS. 'VV' TABLE
XIBATT	(9)	1.0/HOURS	TABLE 2-3	REAL	TABLE OF NORMALIZED CURRENTS FOR 'VBATT'
XIHIT	(10,10)	AMPS	0.0	REAL	TABLE OF HOUSEKEEPING LOAD-REGULATOR CURRENT VS. VOLTAGE AND TEMPERATURE
XIHITT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'XIHIT'
XIHVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE VOLTAGES FOR 'XIHIT'
XII	(30)	AMPS	TABLE 2-3	REAL	TABLE OF REFERENCE SOLAR CELL CURRENTS
ZALPHA	-	-	0.0	REAL	CONFIDENCE LEVEL FOR DESIGN SYNTHESIS YEARLY MINIMUM AND MAXIMUM TEMPERATURE DETERMINATION
ZDIMP	(10,10)	OHMS	0.0	REAL	TABLE OF ZENER DIODE IMPEDANCE VS. VOLTAGE AND TEMPERATURE

TABLE 2-1.-DESIGN SYNTHESIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
ZDIMPT	(10)	°C	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'ZDIMP'
ZDIMPV	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE VOLTAGES FOR 'ZDIMP'
ZDRCNT	-	-	0.0	REAL	PROPORTION FOR DESIGN SYNTHESIS YEARLY MINIMUM AND MAXIMUM TEMPERATURE DETERMINATION
ZRAT	(10,2)	°F,OHMS	0.0	REAL	TABLE OF 'ACTIVE' LAMP REGULATOR IMPEDANCE VS. TEMPERATURE
ZRST	(10,2)	°F,OHMS	0.0	REAL	TABLE OF 'SATURATED' LAMP REGULATOR IMPEDANCE VS. TEMPERATURE
ZSHTAB	(10,2)	°C,OHMS	0.0	REAL	TABLE OF SHUNT LIMITER DYNAMIC IMPEDANCE VS. TEMPERATURE
ZTCOEF	(10,2)	VOLTS,%/°C	0.0	REAL	TABLE OF ZENER DIODE TEMPERATURE COEFFICIENTS VS. THE BREAKDOWN VOLTAGE
****** FREE FORMAT TIME-VARIANT DATA ******					
NWEEK	-	-	0	INTEGER	NO. OF WEEK
CT	(7)	-	0.0	REAL	CLOUD TYPE FOR DAY(I) OF NWEEK: 0.0=CIRRUS OR CIRROSTRATUS 1.0=STRATUS CLOUDS 2.0=OTHER TYPES OF CLOUDS
TC	(7)	-	0.0	REAL	TOTAL CLOUD COVER FOR DAY(I) OF NWEEK (TENTHS OF SKY)

```
@XQT DSPA.DSPA
0,0,0.0,,,
 $INPT
       ACELL=4.0,
       BRCEST=0.05,  BRCHMX=0.1,  BRDEST=-0.05,  BRDSTD=0.05,
       CBAVAL=1.0,1.5,2.5,5.0,6.0,8.0,10.0,15.0,20.0,25.0,30.0,35.0,
              40.0,50.0,70.0,100.0,150.0,200.0,600.0,1200.0,10*0.0,
       CBMAX=60.0,  CDEGA=2.0,  CDEGB=2.0,
       CELPAC=0.7,  CLR=0.55,  CN=0.8,
       CURZ=10.0,50.0,8*0.0,0.25,1.0,8*0.0,
       DCDAT=932.0,1864.0,3728.0,10000.0,6*0.0,213.20,161.90,132.90,
             132.90,6*0.0,
       DCDCHT=17.00,17.00,8*0.0,17.00,17.00,88*0.0,
       DCDCNT=1.0,1000.0,8*0.0,
       DCDCPT=1.0,10000.0,8*0.0,
       DCDCT=1.0,10000.0,8*0.0,
       DCDET=20.00,20.00,8*0.0,20.00,20.00,88*0.0,
       DCDNNT=1.0,10000.0,8*0.0,1.0,10000.0,8*0.0,
       DCDNPT=10.0,50.0,8*0.0,10.0,50.0,8*0.0,
       DCDNT=1.0,1000.0,8*0.0,
       DCDNZT=19.036539,50.00,8*0.0,19.036539,50.00,88*0.0,
              19.036539,50.00,8*0.0,19.036539,50.00,88*0.0,
       DCDPNT=1.0,1000.0,8*0.0,
       DCDPPT=1.0,10000.0,8*0.0,
       DCDPST=17.00,17.00,8*0.0,17.00,17.00,88*0.0,
       DODT=7.6009024,9.6158055,8*0.0,100.0,0.0,8*0.0,
       DTAMB1=0.0,1.0,2.0,3.0,4.0,5.0,6.0,7.0,8.0,
              11.0,12.0,13.0,14.0,15.0,16.0,
              17.0,18.0,19.0,20.0,21.0,22.0,23.0,24.0,
              -3.744,-5.544,-8.064,3*-8.244,-7.344,-10.944,-8.064,
              -2.844,4.356,7.056,10.656,12.456,14.256,12.456,8.856,
              5.256,3.456,1.656,-0.144,-1.044,-1.944,-3.744,-3.744,
       DTTA1=1.0,32.0,60.0,91.0,121.0,152.0,167.0,182.0,197.0,213.0,
             221.0,229.0,237.0,244.0,274.0,305.0,335.0,365.0,348*0.0,
             -7.3,-6.6,-5,5,-4.0,-1.4,2.2,4.2,4.9,5.6,8.0,
             9.8,10.3,9.8,8.8,5.4,1.6,-4.0,-7.3,348*0.0,
       DTTESG=15.0,  DTTPCD=15.0,  DTTPSG=20.0,  DURAM=6.0,
       DWDAT=1.0,10.0,100.0,1000.0,10000.0,5*0.0,5*2.7,5*0.0,
       DWDCHT=1.0,10.0,100.0,10000.0,100000.0,5*0.0,0.01543234,
              0.09259404,0.03858085,0.01082638,0.01082638,5*0.0,
       DWDET=0.0,100.0,8*0.0,0.077,0.077,8*0.0,
       DWDNZT=1.0,10.0,50.0,7*0.0,0.00308647,0.01653465,0.03306930,7*0.0,
              1.0,10.0,50.0,7*0.0,0.00308647,0.01653465,0.03306930,7*0.0,
       DWDPST=1.0,10.0,100.0,10000.0,6*0.0,0.01543234,0.09259404,
              0.03858085,0.01082638,6*0.0,
       FRCELL=0.5,  HDER=0.2,  HDZMX=50.0,
       ICHRT=0,  IFTYPE=3,  INDFLS=1,  ISH=0,
       NBATP=1000,  NCDEG=3,  NCURZ=2,
       NDCDA=4,  NDCDC=2,  NDCDCN=2,  NDCDCP=2,
       NDCDN=2,  NDCDNN=2,  NDCDNP=2,
       NDCDPN=2,  NDCDPP=2,  NDOD=2,  NDTAMB=25
       NDTTA=18,  NDWDA=5,  NDWDCH=5,
       NDWDE=2,  NDWDNZ=3,  NDWDPS=4,
       NPREQ=1,  NSAP=1000,  NTCZT=3,  NTCZV=10,
       NVCHIS=2,  NVCHIO=2,  NVCHT=2,  NVCHV=2,  NVDEG=2,
       NVLBT=7,  NVLBV=10,  NVRISA=7,  NVRIO=7,
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FIGURE 2-1. SAMPLE INPUT FOR DESIGN SYNTHESIS (Sheet 1 of 3)

```
      NXIHT=7,  NXIHV=10,  NZDT=7,  NZDV=3,
      NZRA=7,  NZRS=7,  NZSH=2,  NZTC=10,
      PHIAAD=0.0,  PHIAID=0.0,
      QBRES=0.5,  QOFF=0.69319320,  QON=0.13863864,
      REFLH=0.3,  RLL=0.05,
      SADEGC=0.0,730.0,2000.0,33*0.0,0.0,0.0,10.0,10.0,33*0.0,
      SADEGV=0.0,2000.0,34*0.0,0.0,0.0,5.0,34*0.0,
      SARES=0.2,  SPECOR=1.183,  TBDSTO=70.0,
      TCZIV=-2.0,-1.0,0.00,0.02,0.07,0.17,0.33,0.57,1.05,1.40,
            -1.0,0.00,0.02,0.04,0.10,0.21,0.40,0.64,1.00,1.25,
            0.00,0.01,0.03,0.07,0.15,0.26,0.43,0.64,0.95,1.15,70*0.0,
      TCZT=-55.0,25.0,100.0,7*0.0,
      TCZV=0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,1.00,1.05,
      THELAD=33.9333,  THELOD=118.3833,
      TLLI=0.5,0.2,14*0.0,
      TTAVE=58.9,  TZN=8.0,
      VBUSMN=5.0,  VBUS=12.0,  VDEGA=5.0,
      VCHIST=0.0,200.0,8*0.0,0.17.0,17.0,8*0.0,
      VCHIOT=0.0,200.0,8*0.0,1.5,1.5,8*0.0,
      VCHIT=17.0,22.0,8*0.0,17.0,22.0,68*0.0,
      VCHTT=0.0,200.0,8*0.0,
      VCHVT=14.2,14.5,8*0.0,
      VLBT=0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,30*0.0,
      VLBTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
      VLBVT=0.0,0.6,10.2,12.2,12.3,12.7,13.0,13.25,18.0,100.0,
      VLR=12.0,  VMAXIV=20.0,  VMINIV=0.0,  VSAINC=0.25,
      VRISAT=-40.0,0.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*12.3,3*0.0,
      VRIOT=-40,0.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.6,3*0.0,
      XIHIT=2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            30*0.0,
      XIHTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
      XIHVT=0.0,0.6,1.5,3.8,4.5,10.0,12.3,18.0,20.0,100.0,
      ZDIMP=0.069,0.098,0.185,7*0.0,0.091,0.138,0.243,7*0.0,
            0.120,0.170,0.318,7*0.0,0.135,0.187,0.350,7*0.0,
            0.141,0.197,0.367,7*0.0,0.149,0.205,0.390,7*0.0,
            0.155,0.215,0.400,37*0.0,
      ZDIMPT=-100.0,-50.0,0.0,30.0,50.0,90.0,150.0,3*0.0,
      ZDIMPV=4.983,7.872,19.955,7*0.0,
      ZRAT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.00711,3*0.0,
      ZRST=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.0711,3*0.0,
      ZSHTAB=0.0,100.0,8*0.0,0.7,0.7,8*0.0,
      ZTCOEF=2.0,2.6,3.0,4.0,5.0,5.7,7.0,20.0,100.0,200.0,
         -0.07,-0.08,-0.075,-0.047,-0.005,0.025,0.04,0.077,0.095,0.097,
 $END
1,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
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FIGURE 2-1. SAMPLE INPUT FOR DESIGN SYNTHESIS (Sheet 2 of 3)

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2,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,1.0,2.0,
3,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
4,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
5,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,1.0,2.0,
6,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
7,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
8,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
9,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
10,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
11,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
12,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
13,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
14,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
15,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
16,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
17,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
18,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
19,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
20,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
21,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
22,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
23,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
24,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
25,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
26,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
27,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
28,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
29,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
30,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
31,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
32,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
33,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
34,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
35,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
36,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
37,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
38,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
39,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
40,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
41,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
42,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
43,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
44,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
45,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
46,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
47,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
48,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
49,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
50,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,0.0,0.0,0.8,0.0,0.1.0,1.0,1.0,2.0,
51,1.0,2.0,1.0,3.0,2.0,4.0,2.0,6.0,2.0,9.0,1.0,3.0,1.0,1.0,
52,1.0,1.0,0.0,0.0,0.5,0.0,0.0,0.5,2.0,5.0,2.0,5.0,2.0,4.0,1.0,2.0,
@EOF
```

FIGURE 2-1. SAMPLE INPUT FOR DESIGN SYNTHESIS (Sheet 3 of 3)

2.3 Performance Analysis Input

A listing of the Performance Analysis input variables with their description is provided in Table 2-2. As indicated, there are three types of inputs to the Performance Analysis portion of the DSPA program: namelist, free-format start-up, and free-format time-variant inputs. The namelist input is entered only once at the beginning of the program. Formatting of the Performance Analysis namelist input data cards is as follows:

```
b$INPT                          where b = blank
bAAA=...,                       where AAA ... ZZZ are the names of the
   .                              input variables (in any order)
   .
   .
bZZZ=...,
b$END
```

As with the Design Synthesis namelist input, the Performance Analysis namelist variables are assigned default values by the program (see Table 2-3 below) if values are not entered by the user. However, if both the Design Synthesis and the Performance Analysis routines are to be executed in a single run (IPRG = 2), the values entered for Design Synthesis will become the default values, thereby eliminating the need for the user to re-enter duplicate data. Similarly, the values of several Performance Analysis namelist variables (CB, NBATT, NESP, NP, NS, VBUSI, XICHMX, and XN) which are computed by the Design Synthesis segment will be carried over. The user may, of course, enter different values if he so desires.

Following entry of the namelist data, the user will input a single, free-format, start-up data card. The format for this initialization card is

```
START(1),START(2),START(3),START(4),ACCQB,CT,HLLA,TC,INDFLS,
```

where the variables are as described in Table 2-2.

All items of data must be input since blanks are interpreted as zeroes.

After entering the start-up data card, the user will input a series of free-format time-variant data cards. The format of each of these data cards is

NTS,DURA(1),DURA(2),DURA(3),CT,TC,

where each of the input items is as specified in Table 2-2.

All items of data must be entered on each card. The user may input as many of these "Duration" data cards as he desires. The last card in this series of time-variant data must be an "@EØF" card. A sample set of input for executing the Performance Analysis routine is provided in Figure 2-2. Remember that only the portion of the Performance Analysis namelist data which differs from the Design Synthesis values must be entered under INPT if both routines are to be executed as part of a single DSPA run.

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
AA	(21,5,5)	-	TABLE III	REAL	TABLE OF BATTERY EFFICIENCY VS. STATE-OF-CHARGE, CURRENT, AND TEMPERATURE: 21 VALUES OF EFFICIENCY VS. 'SOC' STATE-OF-CHARGE DATA AT EACH OF 5 'BI' CURRENTS FOR EACH OF 5 'TP' TEMPERATURES
ACELL	-	SQ.CM	0.0	REAL	AREA OF A SINGLE SOLAR CELL
ASCTD	-	SQ.CM	4.0	REAL	STANDARD SOLAR CELL AREA USED FOR 'XII' VS. 'VV' TABLE
AD1	(15,2)	VOLTS,AMPS	TABLE III	REAL	TABLE OF ELECTRICAL SECTION BLOCKING DIODE VOLTAGE DROP VS. CURRENT
AD2	(8,2)	VOLTS,AMPS	TABLE III	REAL	TABLE OF BATTERY DISCHARGE BLOCKING DIODE VOLTAGE DROP VS. DISCHARGE CURRENT
BETAB	(16,8)	MILLIVOLTS/°C	TABLE III	REAL	TABLE OF SOLAR CELL OPEN CIRCUIT VOLTAGE VS. CELL TEMPERATURE AND SOLAR INSOLATION
BI	(5)	AMPS	TABLE III	REAL	TABLE OF REFERENCE CURRENTS FOR 'AA'
BTEMP	(16)	°C	TABLE III	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'BETAB'
CB	-	AMP-HOURS	0.0	REAL	CAPACITY OF SINGLE BATTERY
CDEGA	-	%	0.0	REAL	SOLAR ARRAY CURRENT DEGRADATION FACTOR DUE TO FABRICATION LOSSES
CDEGB	-	%	0.0	REAL	SOLAR ARRAY CURRENT DEGRADATION FACTOR DUE TO TERRESTRIAL PERFORMANCE EXTRAPOLATION UNCERTAINTY
CLR	-	AMPS	0.0	REAL	LAMP CURRENT RATING
CLSIT	(6)	AMPS	TABLE 2-3	REAL	TABLE OF REFERENCE LAMP CURRENT RATINGS FOR CLST
CLST	(6,7)	-	TABLE 2-3	REAL	TABLE OF COLD FILAMENT LAMP SURGE COEFFICIENT VS. LAMP CURRENT RATING AND INITIAL FLASH DURATION
CLSTT	(7)	SECONDS	TABLE 2-3	REAL	TABLE OF REFERENCE LAMP FLASH DURATIONS FOR CLST
CN	-	-	0.0	REAL	CLEARNESS NUMBER
CSH	-	%/°C	0.0	REAL	SHUNT LIMITER TURN-ON VOLTAGE COEFFICIENT
CURZ	(10,2)	WATTS,AMPS	0.0	REAL	TABLE OF ZENER DIODE CURRENT VS. MAXIMUM HEAT DISSIPATION
DTAMB1	(25,2)	HOURS,°F	0.0	REAL	TABLE OF HOURLY TEMPERATURE VARIATION VS. TIME OF DAY
DTTA1	(366,2)	DAYS,°F	0.0	REAL	TABLE OF DAILY TEMPERATURE VARIATION VS. DAY OF YEAR
DTTESG	-	°F	0.0	REAL	ENERGY STORAGE GROUP EQUIPMENT TEMPERATURE RISE
DTTPCD	-	°F	0.0	REAL	POWER CONDITIONING/DISTRIBUTION GROUP TEMPERATURE RISE
DTTPSG	-	°F	0.0	REAL	POWER SOURCE GROUP EQUIPMENT TEMPERATURE RISE

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
FA	(7,5)	-	TABLE III	REAL	SOLAR RADIATION FOURIER COEFFICIENTS. 7 EACH FOR: SOLAR DECLINATION ANGLE EQUATION OF TIME DIFFERENCE APPARENT SOLAR CONSTANT ATMOSPHERIC EXTINCTION FCTR SKY DIFFUSE FACTOR
HDER	-	-	0.0	REAL	HEAT DISSIPATION DERATING FACTOR FOR A SINGLE ZENER DIODE
HDZMX	-	WATTS	0.0	REAL	MAXIMUM HEAT DISSIPATION FOR A SINGLE ZENER DIODE
ICHRT	-	-	0	INTEGER	BATTERY CHARGER TYPE: 0=NO CHARGER PRESENT 1=CONSTANT VOLTAGE CHARGER WITH CURRENT LIMIT
IFTYPE	-	-	0	INTEGER	FLASHER PATTERN TYPE: 0=NON-STANDARD PATTERN 1-15=STANDARD PATTERNS
IPSG	-	-	0	INTEGER	POWER SOURCE GROUP TYPE: 0=ONE SHUNT LIMITER PER SOLAR ARRAY 1=ONE SHUNT LIMITER PER SOLAR ARRAY ELECTRICAL SECTION
ISH	-	-	0	INTEGER	SHUNT LIMITER TYPE: 0=NO SHUNT LIMITER PRESENT 1=ORDINARY ZENER DIODE 2=TEMPERATURE-COMPENSATED ZENER DIODE 3=ACTIVE SHUNT LIMITER
NAD1	-	-	15	INTEGER	NO. OF VALID DATA POINTS FOR 'AD1' TABLE
NAD2	-	-	9	INTEGER	NO. OF VALID DATA POINTS FOR 'AD2' TABLE
NBATT	-	-	0	INTEGER	NO. OF BATTERIES IN PARALLEL
NBTEMP	-	-	16	INTEGER	NO. OF VALID DATA POINTS FOR 'BTEMP' TABLE
NDEG	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'SADEGC' TABLE
NCURZ	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'CURZ' TABLE
NDTAMB	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DTAMB1' TABLE
NDTTA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'DTTA1' TABLE
NESF	-	-	0	INTEGER	NO. OF SOLAR CELL ELECTRICAL CIRCUITS IN SOLAR ARRAY
NP	-	-	0	INTEGER	NO. OF SOLAR CELLS IN PARALLEL IN EACH ELECTRICAL CIRCUIT
NPLT	-	-	0	INTEGER	MAXIMUM NO. OF 'INSTANTANEOUS' I-V PLOTS TO BE PERMITTED FOR A SINGLE RUN

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
NROE	-	-	23	INTEGER	NO. OF VALID DATA POINTS FOR 'ROE', 'SUNLIT' TABLES
NRSCEL	-	-	26	INTEGER	NO. OF VALID DATA POINTS FOR 'RSCELL', 'TEMTAB' TABLES
NS	-	-	0	INTEGER	NO. OF SOLAR CELLS IN SERIES IN EACH ELECTRICAL CIRCUIT
NSOC	-	-	21	INTEGER	NO. OF VALID DATA POINTS FOR 'SOC' TABLE
NSPGR	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'SPGR1' TABLE
NSUNMW	-	-	8	INTEGER	NO. OF VALID DATA POINTS FOR 'SUNMW' TABLE
NTBERZ	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'TBERZ1' TABLE
NTCZT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'TCZIT' TABLE
NTCZV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'TCZVT' TABLE
NVCHIS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHIST' TABLE
NVCHIO	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHICT' TABLE
NVCHT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHTT' TABLE
NVCHV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VCHVT' TABLE
NVDEG	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'SADEGV' TABLE
NVLST	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VLSTT' TABLE
NVLOV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VLBVT' TABLE
NVRISA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VRISAT' TABLE
NVRIU	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'VRIUT' TABLE
NXIHT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'XIHTT' TABLE
NXIHV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'XIHVT' TABLE
NZCHRA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZCHRAT' TABLE
NZCHRS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZCHRST' TABLE
NZDT	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZDIMPT' TABLE
NZDV	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZDIMPV' TABLE
NZRA	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZRAT' TABLE
NZRS	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZRST' TABLE

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
NZS	-	-	0	INTEGER	NO. OF ZENER DIODES IN SERIES
NZSH	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZSHTAB' TABLE
NZTC	-	-	0	INTEGER	NO. OF VALID DATA POINTS FOR 'ZTCOEF' TABLE
PHIAAD	-	DEGREES	0.0	REAL	SOLAR ARRAY SURFACE AZIMUTH ANGLE FROM THE SOUTH
PHIAID	-	DEGREES	0.0	REAL	SOLAR ARRAY SURFACE TILT ANGLE FROM THE HORIZONTAL
P0	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P1	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P2	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
P3	(3,2)	-	TABLE III	REAL	CLOUD COVER MODIFIER POLYNOMIAL COEFFICIENTS
QB	-	-	0.0	REAL	STATE-OF-CHARGE OF BATTERIES
QBATT	(21)	-	TABLE III	REAL	TABLE OF REFERENCE STATES-OF-CHARGE FOR 'VBATT'
QOFF	-	WATTS/SQ.M	0.0	REAL	SOLAR INSOLATION LEVEL FOR LAMP FLASHER TURN-OFF
QON	-	WATTS/SQ.M	0.0	REAL	SOLAR INSOLATION LEVEL FOR LAMP FLASHER TURN-ON
REFLH	-	-	0.0	REAL	HORIZONTAL SURFACE REFLECTIVITY FOR SOLAR RADIATION
RL	-	OHMS	0.0	REAL	RESISTANCE OF CABLE CONNECTED TO BATTERIES
RLL	-	OHMS	0.0	REAL	USER LOAD CABLE RESISTANCE
ROE	(23)	%	TABLE III	REAL	TABLE OF SOLAR CELL I-V CURVE CORRECTION FACTORS VS. SOLAR INSOLATION
RSA	-	OHMS	0.0	REAL	SERIES RESISITANCE OF CABLE FOR AN ELECTRICAL SECTION OF THE SOLAR ARRAY
RSCELL	(26)	OHMS	TABLE III	REAL	TABLE OF SOLAR CELL SERIES RESISTANCE VS. CELL TEMPERATURE
SADIGC	(36,2)	DAYS,%	0.0	REAL	TABLE OF SOLAR ARRAY INPUT CURRENT DEGRADATION FACTORS DUE TO THE ENVIRONMENT VS. DAYS SINCE START OF TEST
SADIGV	(36,2)	DAYS,%	0.0	REAL	TABLE OF SOLAR ARRAY OPEN CIRCUIT VOLTAGE DEGRADATION FACTORS DUE TO THE ENVIRONMENT VS. DAYS SINCE START OF TEST
SOC	(21)	-	TABLE III	REAL	TABLE OF REFERENCE STATES-OF-CHARGE FOR 'AA'
SPECOR	-	-	0.0	REAL	SOLAR CELL SPECTRAL CORRECTION FACTOR
SPGFI	(10,2)	(SOC,SG)	0.0	REAL	TABLE OF ELECTROLYTE SPECIFIC GRAVITY VS. STATE-OF-CHARGE

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
SUNLIT	(23)	WATTS	TABLE III	REAL	TABLE OF REFERENCE SOLAR INSOLATION VALUES FOR 'ROE'
SUNMW	(8)	MILLIWATTS	TABLE III	REAL	TABLE OF REFERENCE SOLAR INSOLATION VALUES FOR 'BETAB'
TBATT	(6)	°F	TABLE III	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'VBATT'
TBFRZ1	(10,2)	(SG),°F	0.0	REAL	TABLE OF ELECTROLYTE FREEZING TEMPERATURE VS. ELECTROLYTE SPECIFIC GRAVITY
TCSTD	-	°C	60.0	REAL	STANDARD SOLAR CELL TEMPERATURE USED FOR 'XII' VS. 'VV' TABLE
TCZIV	(10,10)	-	0.0	REAL	TABLE OF ZENER DIODE CURRENT RATIO VS. VOLTAGE RATIO AND TEMPERATURE
TCZT	(10)	°C	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'TCZIV'
TCZV	(10)	-	0.0	REAL	TABLE OF REFERENCE VOLTAGE RATIOS FOR 'TCZIV'
TEMTAB	(26)	°C	TABLE III	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'RSCELL'
THELAD	-	DEGREES	0.0	REAL	BUOY LATITUDE: +=NORTH, -=SOUTH
THELOD	-	DEGREES	0.0	REAL	BUOY LONGITUDE: +=WEST, -=EAST
TLL1	(16)	SECONDS	0.0	REAL	TABLE OF NON-STANDARD FLASHER PATTERNS (TIMES ON/OFF)
TLO	(16,15)	SECONDS	TABLE III	REAL	TABLE OF STANDARD FLASHER PATTERNS (ON/OFF) VS. 'IFTYPE'
TP	(5)	°F	TABLE III	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'AA'
TSHREF	-	°C	0.0	REAL	SHUNT LIMITER REFERENCE TEMPERATURE
TTAVE	-	°F	0.0	REAL	AVERAGE YEARLY TEMPERATURE AT SELECTED LOCATION
TZBR	-	°C	0.0	REAL	TEMPERATURE OF ZENER DIODE AT BREAKDOWN VOLTAGE ('VZBR')
TZN	-	HOURS	0.0	REAL	TIME ZONE NUMBER (HOURS BEHIND GREENWICH MEAN TIME)
VBATT	(9,21,6)	VOLTS	TABLE III	REAL	TABLE OF BATTERY VOLTAGE VS. CURRENT, STATE-OF-CHARGE, AND TEMPERATURE: 9 VALUES OF VOLTAGE VS. 'XIBATT' CURRENT AT EACH OF 21 'QBATT' STATES-OF-CHARGE FOR EACH OF 6 'TBATT' TEMPERATURES
VBUS	-	VOLTS	0.0	REAL	INITIAL ESTIMATE OF POWER SYSTEM OPERATING POINT VOLTAGE
VBUSMN	-	VOLTS	0.0	REAL	MINIMUM ALLOWABLE BUS VOLTAGE
VCHIST	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF BATTERY CHARGER 'SATURATED/ACTIVE' INPUT VOLTAGE VS. TEMPERATURE

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
VCHIOT	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF BATTERY CHARGER INPUT VOLTAGE AT TURN-ON VS. TEMPERATURE
VCHIT	(10,10)	VOLTS	0.0	REAL	TABLE OF BATTERY CHARGER "ACTIVE" INPUT VOLTAGE VS. CHARGER OUTPUT VOLTAGE AND TEMPERATURE
VCHTT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR "VCHIT"
VCHVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE CHARGER OUTPUT VOLTAGES FOR "VCHIT"
VDEGA	-	%	0.0	REAL	SOLAR ARRAY OPEN CIRCUIT VOLTAGE DEGRADATION FACTOR DUE TO TEMPERATURE UNCERTAINTY
VLBT	(10,10)	VOLTS	0.0	REAL	TABLE OF LAMP REGULATOR OUTPUT VOLTAGE VS. INPUT VOLTAGE AND TEMPERATURE
VLBTT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR "VLBT"
VLBVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE INPUT VOLTAGES FOR "VLBT"
VLR	-	VOLTS	0.0	REAL	LAMP VOLTAGE RATING
VMAXIV	-	VOLTS	0.0	REAL	MAXIMUM RAW POWER BUS VOLTAGE
VMINIV	-	VOLTS	0.0	REAL	MINIMUM RAW POWER BUS VOLTAGE
VRISAT	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF "SATURATED/ACTIVE" LAMP REGULATOR VOLTAGE VS. TEMPERATURE
VRIOT	(10,2)	°F,VOLTS	0.0	REAL	TABLE OF "SATURATED" LAMP REGULATOR VOLTAGE VS. TEMPERATURE
VSAINC	-	VOLTS	0.0	REAL	SOLAR ARRAY VOLTAGE INCREMENT
VSHTOR	-	VOLTS	0.0	REAL	REQUIRED SHUNT LIMITER TURN-ON VOLTAGE AT "TSHREF"
VV	(30)	VOLTS	TABLE III	REAL	TABLE OF REFERENCE SOLAR CELL VOLTAGES
VZBR	-	VOLTS	0.0	REAL	BREAKDOWN VOLTAGE FOR A SINGLE ZENER DIODE
XCSTD	-	MILLIWATTS/SQ.CM	145.0	REAL	STANDARD SOLAR INTENSITY USED FOR "XII" VS. "VV" TABLE
XIBATT	(9)	AMPS	TABLE III	REAL	TABLE OF REFERENCE CURRENTS FOR "VBATT"
XICHMX	-	AMPS	0.0	REAL	MAXIMUM ALLOWABLE CHARGE CURRENT PER BATTERY
XIHIT	(10,10)	AMPS	0.0	REAL	TABLE OF HOUSEKEEPING LOAD-REGULATOR CURRENT VS. VOLTAGE AND TEMPERATURE
XIHTT	(10)	°F	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR "XIHIT"
XIHVT	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE VOLTAGES FOR "XIHIT"
XII	(30)	AMPS	TABLE III	REAL	TABLE OF REFERENCE SOLAR CELL CURRENTS

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
XN	-	-	0.0	REAL	NO. OF CELLS IN SERIES IN A SINGLE BATTERY
XPLT	(10)	DAYS	0.0	REAL	TIMES (DAY + HOUR/24) AT WHICH I-V PLOTS ARE DESIRED
ZCHRAT	(10,2)	°F,OHMS	0.0	REAL	TABLE OF OUTPUT IMPEDANCE OF 'ACTIVE' BATTERY CHARGER VS. TEMPERATURE
ZCHRST	(10,2)	°F,OHMS	0.0	REAL	TABLE OF OUTPUT IMPEDANCE OF 'SATURATED' BATTERY CHARGER VS. TEMPERATURE
ZDIMP	(10,10)	OHMS	0.0	REAL	TABLE OF ZENER DIODE IMPEDANCE VS. VOLTAGE AND TEMPERATURE
ZDIMPT	(10)	°C	0.0	REAL	TABLE OF REFERENCE TEMPERATURES FOR 'ZDIMP'
ZDIMPV	(10)	VOLTS	0.0	REAL	TABLE OF REFERENCE VOLTAGES FOR 'ZDIMP'
ZRAT	(10,2)	°F,OHMS	0.0	REAL	TABLE OF 'ACTIVE' LAMP REGULATOR IMPEDANCE VS. TEMPERATURE
ZRST	(10,2)	°F,OHMS	0.0	REAL	TABLE OF 'SATURATED' LAMP REGULATOR IMPEDANCE VS. TEMPERATURE
ZSHTAB	(10,2)	°C,OHMS	0.0	REAL	TABLE OF SHUNT LIMITER DYNAMIC IMPEDANCE VS. TEMPERATURE
ZTCOEF	(10,2)	VOLTS,%/°C	0.0	REAL	TABLE OF ZENER DIODE TEMPERATURE COEFFICIENTS VS. THE BREAKDOWN VOLTAGE
****** FREE FORMAT START-UP DATA ******					
ACCOB	-	-	0.01	REAL	REQUIRED ACCURACY FOR BATTERY STATE-OF-CHARGE CALCULATIONS
CT	-	-	0.0	REAL	CLOUD TYPE AT START-UP: 0.0=CIRRUS OR CIRROSTRATUS 1.0=STRATUS CLOUDS 2.0=OTHER TYPES OF CLOUDS
HLLA	-	HOURS	1.0	REAL	NOMINAL TIME INCREMENT FOR PERFORMANCE ANALYSIS CALCULATION
INDFLS	-	-	0	INTEGER	LAMP FLASHER CONDITION FLAG: 0=LAMP FLASHER OFF 1=LAMP FLASHER ON (FLASHING)
START	(4)	-	0.0	REAL	START-UP TIME: YEAR, DAY, HOUR, MINUTE OF START OF TEST
TC	-	-	0.0	REAL	CLOUD COVER AT START-UP (TENTHS OF SKY COVERED)
****** FREE FORMAT TIME-VARIANT DATA ******					
CT	-	-	0.0	REAL	CLOUD TYPE DURING SIGNIFICANT TIME INTERVAL: 0.0=CIRRUS OR CIRROSTRATUS 1.0=STRATUS CLOUDS 2.0=OTHER TYPES OF CLOUDS

TABLE 2-2.-PERFORMANCE ANALYSIS INPUT (contd)

NAME	DIMENSIONS	UNITS	DEFAULT	TYPE	DESCRIPTION
DURA	(3)	-	0.0	REAL	DURATION OF SIGNIFICANT TIME INTERVAL: DAYS,HOURS,MINUTES
NTS	-	-	0	INTEGER	NUMBER OF PERFORMANCE ANALYSIS DATA PRINTOUT TIME STEPS DURING SIGNIFICANT TIME INTERVAL
TC	-	-	0.0	REAL	CLOUD COVER DURING SIGNIFICANT TIME INTERVAL (TENTHS OF SKY)

```
@XQT DSPA.DSPA
1,0,0.0,12.0,9.0,
 $INPT
      ACELL=4.0,
      CB=20.0,  CDEGA=2.0,  CDEGB=2.0,
      CLR=0.55,  CN=0.8,  CSH=0.1,
      CURZ=10.0,50.0,8*0.0,0.25,1.0,8*0.0,
      DTAMBI=0.0,1.0,2.0,3.0,4.0,5.0,6.0,7.0,8.0,
             11.0,12.0,13.0,14.0,15.0,16.0,
             17.0,18.0,19.0,20.0,21.0,22.0,23.0,24.0,
             -3.744,-5.544,-8.064,3*-8.244,-7.344,-10.944,-8.064,
             -2.844,4.356,7.056,10.656,12.456,14.256,12.456,8.856,
             5.256,3.456,1.656,-0.144,-1.044,-1.944,-3.744,-3.744,
      DTTAI=1.0,32.0,60.0,91.0,121.0,152.0,167.0,182.0,197.0,213.0,
            221.0,229.0,237.0,244.0,274.0,305.0,335.0,365.0,348*0.0,
            -7.3,-6.6,-5.5,-4.0,-1.4,2.2,4.2,4.9,5.6,8.0,
            9.8,10.3,9.8,8.8,5.4,1.6,-4.0,-7.3,348*0.0,
      DTTESG=15.0,  DTTPCD=15.0,  DTTPSG=20.0,
      HDER=0.2,  HDZMX=15.0,
      ICHRT=1,  IFTYPE=3,  IPSG=1,  ISH=2,
      NBATT=2,  NCDEG=3,  NCURZ=2,  NDTAMB=25,  NDTTA=18,
      NESP=2,  NP=10,  NPLT=10,  NS=30,  NSPGR=4,
      NTBFRZ=10,  NTCZT=3,  NTCZV=10,  NVDEG=2,
      NVCHIS=2,  NVCHIO=2,  NVCHT=2,  NVCHV=2,
      NVLBT=7,  NVLBV=10,  NVRISA=7,  NVRIO=7,
      NXIHT=7,  NXIHV=10,  NZCHRA=2,  NZCHRS=2,
      NZDT=7,  NZDV=3,  NZRA=7,  NZRS=7,
      NZS=3,  NZSH=2,  NZTC=10,
      PHIAAD=0.0,  PHIAID=0.0,
      QB=0.75,  QOFF=0.69319320,  QON=0.13863864,
      RL=0.02,  REFLH=0.3,  RLL=0.05,  RSA=0.05,
      SADEGC=0.0,730.0,2000.0,33*0.0,0.0,10.0,10.0,33*0.0,
      SADEGV=0.0,2000.0,34*0.0,0.0,5.0,34*0.0,
      SPECOR=1.183,
      SPGRI=0.0,0.2,0.4,0.6,0.8,1.0,4*0.0,
            1.09,1.13,1.173,1.215,1.258,1.300,4*0.0,
      TBFRZI=1.30,1.29,1.28,1.27,1.26,1.22,1.16,1.10,1.04,1.01,
             -95.0,-97.0,-92.0,-78.0,-76.0,-30.0,2.0,18.0,28.0,32.0,
      TCZIV=-2.0,-1.0,0.00,0.02,0.07,0.17,0.33,0.57,1.05,1.40,
            -1.0,0.00,0.02,0.04,0.10,0.21,0.40,0.64,1.00,1.25,
            0.00,0.01,0.03,0.07,0.15,0.26,0.43,0.64,0.95,1.15,70*0.0,
      TCZT=-55.0,25.0,100.0,7*0.0,
      TCZV=0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,1.00,1.05,
      THELAD=33.9333,  THELOD=118.3833,
      TLLI=0.5,0.2,14*0.0,
      TSHREF=20.0,  TTAVE=58.9,  TZBR=20.0,  TZN=8.0,
      VBUS=10.0,  VDEGA=5.0,
      VCHIST=0.0,200.0,8*0.0,17.0,17.0,8*0.0,
      VCHIOT=0.0,200.0,8*0.0,1.5,1.5,8*0.0,
      VCHIT=17.0,22.0,8*0.0,17.0,22.0,88*0.0,
      VCHTT=0.0,200.0,8*0.0,
      VCHVT=14.2,14.5,8*0.0,
      VLBT=0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
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FIGURE 2-2. SAMPLE INPUT FOR PERFORMANCE ANALYSIS (Sheet 1 of 2)

```
        0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
        0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
        0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,30*0.0,
    VLBTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
    VLBVT=0.0,0.6,10.2,12.2,12.3,12.7,13.0,13.25,18.0,100.0,
    VLR=12.0,  VMAXIV=20.0,  VMINIV=0.0,
    VRISAT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*12.3,3*0.0,
    VRIOT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.6,3*0.0,
    VSAINC=0.25,  VSHTOR=8.97,  VZBR=2.99,
    XICHMX=10.0,
    XIHIT=2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
          30*0.0,
    XIHTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
    XIHVT=0.0,0.6,1.5,3.8,4.5,10.0,12.3,18.0,20.0,100.0,
    XN=5.0,
    XPLT=1.0,1.15,1.3,1.45,1.6,1.8,2.3,2.45,2.6,3.4,
    ZCHRAT=0.0,200.0,8*0.0,0.1,0.1,8*0.0,
    ZCHRST=0.0,200.0,8*0.0,0.1,0.1,8*0.0,
    ZDIMP=0.069,0.098,0.185,7*0.0,0.091,0.138,0.243,7*0.0,
          0.120,0.170,0.318,7*0.0,0.135,0.187,0.350,7*0.0,
          0.141,0.197,0.367,7*0.0,0.149,0.205,0.390,7*0.0,
          0.155,0.215,0.400,37*0.0,
    ZDIMPT=-100.0,-50.0,0.0,30.0,50.0,90.0,150.0,3*0.0,
    ZDIMPV=4.983,7.872,19.955,7*0.0,
    ZRAT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.0071,3*0.0,
    ZRST=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.0711,3*0.0,
    ZSHTAB=0.0,100.0,8*0.0,0.7,0.7,8*0.0,
    ZTCOEF=2.0,2.6,3.0,4.0,5.0,5.7,7.0,20.0,100.0,200.0,
       -0.07,-0.08,-0.075,-0.047,-0-005,0.025,0.04,0.077,0.095,0.097,
 $END
1975.0,1.0,0.0,0.0,0.0,0.01,1.0,0.5,0.5,1,
1,0.0,4.0,0.0,0.0,1.0,1.0,
1,0.0,4.0,0.0,0.0,0.0,1.0,
2,0.0,8.0,0.0,0.0,0.0,0.0,
1,0.0,4.0,0.0,0.0,0.0,0.0,
1,0.0,8.0,0.0,1.0,1.0,
1,0.0,4.0,0.0,0.0,0.0,2.0,
2,0.0,8.0,0.0,0.0,0.0,1.0,
1,0.0,4.0,0.0,0.0,0.0,0.0,
1,0.0,8.0,0.0,1.0,1.0,
1,0.0,4.0,0.0,0.0,0.0,2.0,
2,0.0,8.0,0.0,0.0,0.0,3.0,
1,0.0,4.0,0.0,0.0,0.0,4.0,
1,0.0,4.0,0.0,0.0,0.0,5.0,
@EOF
YES
```

FIGURE 2-2. SAMPLE INPUT FOR PERFOMRANCE ANALYSIS (Sheet 2 of 2)

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM

VARIABLE	DIMENSIONS	DEFAULT VALUE
AA	(2,5,5)	
	AA(1,1,1)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,2,1)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,3,1)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,4,1)	1.000, 0.976, 0.956, 0.940, 0.930, 0.920, 0.910, 0.900, 0.880, 0.860, 0.833, 0.817, 0.800, 0.782, 0.765, 0.747, 0.730, 0.685, 0.640, 0.523, 0.000
	AA(1,5,1)	1.000, 0.835, 0.670, 0.610, 0.585, 0.560, 0.540, 0.525, 0.510, 0.490, 0.470, 0.460, 0.435, 0.422, 0.410, 0.396, 0.375, 0.354, 0.300, 0.208, 0.000
	AA(1,1,2)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,2,2)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,3,2)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,4,2)	1.000, 0.976, 0.956, 0.940, 0.930, 0.920, 0.910, 0.900, 0.880, 0.860, 0.833, 0.817, 0.800, 0.782, 0.765, 0.747, 0.730, 0.685, 0.640, 0.523, 0.000
	AA(1,5,2)	1.000, 0.835, 0.670, 0.610, 0.585, 0.560, 0.540, 0.525, 0.510, 0.490, 0.470, 0.460, 0.435, 0.422, 0.410, 0.396, 0.375, 0.354, 0.300, 0.208, 0.000
	AA(1,1,3)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,2,3)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,3,3)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,4,3)	1.000, 0.976, 0.956, 0.940, 0.930, 0.920, 0.910, 0.900, 0.880, 0.860, 0.833, 0.817, 0.800, 0.782, 0.765, 0.747, 0.730, 0.685, 0.640, 0.523, 0.000
	AA(1,5,3)	1.000, 0.835, 0.670, 0.610, 0.585, 0.560, 0.540, 0.525, 0.510, 0.490, 0.470, 0.460, 0.435, 0.422, 0.410, 0.396, 0.375, 0.354, 0.300, 0.208, 0.000
	AA(1,1,4)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976, 0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900, 0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	AA(1,2,4)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976,
		0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900,
		0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,3,4)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976,
		0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900,
		0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,4,4)	1.000, 0.976, 0.956, 0.940, 0.930, 0.920, 0.910,
		0.900, 0.880, 0.860, 0.833, 0.817, 0.800, 0.782,
		0.765, 0.747, 0.730, 0.685, 0.640, 0.523, 0.000
	AA(1,5,4)	1.000, 0.835, 0.670, 0.610, 0.585, 0.560, 0.540,
		0.525, 0.510, 0.490, 0.470, 0.460, 0.435, 0.422,
		0.410, 0.396, 0.375, 0.354, 0.300, 0.208, 0.000
	AA(1,1,5)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976,
		0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900,
		0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,2,5)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976,
		0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900,
		0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,3,5)	1.000, 0.998, 0.995, 0.992, 0.988, 0.984, 0.976,
		0.968, 0.960, 0.950, 0.930, 0.920, 0.910, 0.900,
		0.890, 0.880, 0.870, 0.850, 0.830, 0.787, 0.000
	AA(1,4,5)	1.000, 0.976, 0.956, 0.940, 0.930, 0.920, 0.910,
		0.900, 0.880, 0.860, 0.833, 0.817, 0.800, 0.782,
		0.765, 0.747, 0.730, 0.685, 0.640, 0.523, 0.000
	AA(1,5,5)	1.000, 0.835, 0.670, 0.610, 0.585, 0.560, 0.540,
		0.525, 0.510, 0.490, 0.470, 0.460, 0.435, 0.422,
		0.410, 0.396, 0.375, 0.354, 0.300, 0.208, 0.000
AD1	(15,2)	
	AD1(1,1)	0.58, 0.6, 0.65, 0.7, 0.75, 0.775, 0.8, 0.825,
		0.85, 0.875, 0.9, 0.925, 0.95, 0.975, 1.0
	AD1(1,2)	0.0, 0.05, 0.2, 0.4, 0.88, 1.18, 1.5, 1.91,
		2.4, 2.97, 3.70, 4.35, 5.3, 6.2, 7.7
AD2	(8,2)	
	AD2(1,1)	0.75, 0.775, 0.8, 0.825, 0.85, 0.9, 0.95, 1.0
	AD2(1,2)	0.0, 2.0, 4.0, 6.3, 8.8, 14.4, 22.3, 30.0
BETAB	(16,8)	
	BETAB(1,1)	2.235, 2.209, 2.199, 2.198, 2.202, 2.216, 2.230, 2.244,
		2.258, 2.272, 2.286, 2.300, 2.314, 2.328, 2.342, 2.356
	BETAB(1,2)	2.245, 2.219, 2.200, 2.192, 2.196, 2.210, 2.224, 2.238,
		2.252, 2.266, 2.280, 2.294, 2.308, 2.322, 2.336, 2.350
	BETAB(1,3)	2.158, 2.185, 2.211, 2.229, 2.234, 2.231, 2.219, 2.196,
		2.164, 2.123, 2.081, 2.058, 1.875, 1.680, 1.490, 1.300
	BETAB(1,4)	2.295, 2.318, 2.338, 2.353, 2.356, 2.344, 2.309, 2.273,
		2.237, 2.201, 2.165, 2.142, 1.977, 1.800, 1.635, 1.463
	BETAB(1,5)	2.338, 2.360, 2.378, 2.392, 2.395, 2.382, 2.340, 2.303,
		2.270, 2.243, 2.222, 2.199, 2.034, 1.871, 1.709, 1.549
	BETAB(1,6)	2.375, 2.400, 2.420, 2.440, 2.445, 2.431, 2.392, 2.355,
		2.327, 2.305, 2.283, 2.260, 2.095, 1.932, 1.770, 1.605
	BETAB(1,7)	2.406, 2.428, 2.450, 2.462, 2.475, 2.456, 2.423, 2.394,
		2.367, 2.341, 2.316, 2.283, 2.120, 1.958, 1.795, 1.630
	BETAB(1,8)	2.928, 2.950, 2.971, 2.992,3.000, 2.986, 2.960, 2.931,
		2.898, 2.863, 2.826, 2.786, 2.620, 2.440, 2.290, 2.140

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
BI	(5)	0.0001, 0.001, 0.005, 0.5, 1.05
BTEMP	(16)	160.0, 140.0, 120.0, 100.0, 80.0, 60.0, 40.0, 20.0, 0.0, -20.0, -40.0, -60.0, -80.0, -100.0, -120.0, -140.0
CLSIT	(6)	0.25, 0.55, 0.77, 1.17, 2.03, 3.05,
CLST	(6,7)	
	CLST(1,1)	1.112, 1.162, 1.190, 1.235, 1.360, 1.430
	CLST(1,2)	1.064, 1.129, 1.161, 1.200, 1.291, 1.361
	CLST(1,3)	1.072, 1.100, 1.130, 1.157, 1.232, 1.282
	CLST(1,4)	1.064, 1.084, 1.116, 1.139, 1.207, 1.249
	CLST(1,5)	1.032, 1.051, 1.060, 1.078, 1.099, 1.121
	CLST(1,6)	1.016, 1.025, 1.030, 1.043, 1.049, 1.062
	CLST(1,7)	1.008, 1.016, 1.019, 1.026, 1.034, 1.039
CLSTT	(7)	0.3, 0.4, 0.5, 0.6, 1.0, 2.0, 3.0
FA	(7,5)	
	FA(1,1)	0.302, -22.93, -0.229, -0.243, 3.851, 0.002, -0.55
	FA(1,2)	0.0, 0.007, -0.05, -0.0015, -0.122, -0.156, -0.005
	FA(1,3)	368.44, 24.52, -1.14, -1.09, 0.58, -0.18, 0.28
	FA(1,4)	0.1717, -0.0344, 0.0032, 0.0024, -0.0043, 0.0, -0.0008
	FA(1,5)	0.0905, -0.041, 0.0073, 0.0015, -0.0034, 0.0004, -0.0006
PO	(3,2)	0.598, 0.908, 0.849, 1.010, 0.724, 0.959
P1	(3,2)	0.00026, -0.03214, -0.01277, -0.01394, -0.00652, -0.02304
P2	(3,2)	0.0021, 0.0102, 0.0036, 0.00553, 0.00191, 0.00787
P3	(3,2)	-0.00035, -0.00114, -0.00059, -0.00068, -0.00047, -0.00091
QBATT	(21)	0.00, 0.03, 0.05, 0.10, 0.15, 0.20, 0.25, 0.35, 0.40, 0.45, 0.475, 0.50, 0.70, 0.75, 0.80, 0.86, 0.875, 0.89, 0.92, 0.94, 1.00
ROE	(23)	0.07600, 0.05400, 0.04030, 0.03130, 0.02550, 0.02120, 0.01100, 0.00740, 0.00570, 0.00480, 0.00381, 0.00335, 0.00264, 0.00223, 0.00200, 0.00177, 0.00168, 0.00148, 0.00132, 0.00124, 0.00120, 0.00122, 0.001241
RSCELL	(26)	0.1889, 0.1816, 0.1742, 0.1668, 0.1596, 0.1524, 0.1509, 0.1458, 0.1400, 0.1350, 0.1311, 0.1283, 0.1262, 0.1240, 0.1213, 0.1176, 0.1130, 0.1075, 0.1016, 0.0957, 0.0904, 0.0860, 0.0823, 0.0785, 0.0748, 0.0709
SOC	(21)	0.00, 0.03, 0.06, 0.10, 0.15, 0.20, 0.30, 0.40, 0.50, 0.60, 0.70, 0.75, 0.80, 0.825, 0.85, 0.875, 0.90, 0.925, 0.95, 0.975, 1.00
SUNLIT	(23)	5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 15.0, 20.0, 25.0, 30.0, 40.0, 50.0, 75.0, 100.0, 120.0, 140.0, 160.0, 200.0, 253.0, 300.0, 394.0, 500.0, 540.0
SUNMW	(8)	540.0, 394.0, 253.0, 139.6, 100.0, 50.0, 25.0, 5.0
TBATT	(6)	-40.0, -20.0, 50.0, 70.0, 90.0, 120.0
TEMTAB	(26)	-140.0, -120.0, -100.0, -80.0, -60.0, -40.0, -30.0, -20.0, -10.0, 0.0, 10.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0, 110.0, 120.0, 130.0, 140.0, 150.0, 160.0

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
TLO	(16,15)	
	TLO(1,1)	0.3, 0.7, 14*0.0
	TLO(1,2)	0.5, 2.0, 14*0.0
	TLO(1,3)	0.4, 3.6, 14*0.0
	TLO(1,4)	1.0, 5.0, 14*0.0
	TLO(1,5)	3.0, 3.0, 14*0.0
	TLO(1,6)	3.0, 1.0, 14*0.0
	TLO(1,7)	5*(0.3, 0.7), 0.3, 0.6, 4*0.0
	TLO(1,8)	0.4, 0.6, 0.4, 3.6, 12*0.0
	TLO(1,9)	0.4, 0.6, 2.0, 5.0, 12*0.0
	TLO(1,10)	1.0, 15*0.0
	TLO(1,11)	16*0.0
	TLO(1,12)	16*0.0
	TLO(1,13)	16*0.0
	TLO(1,14)	16*0.0
	TLO(1,15)	16*0.0
TP	(5)	-40.0, -20.0, 50.0, 90.0, 120.0
VBATT	(9,21,6)	
	VBATT(1, 1,1)	1.9618,1.9808,1.9997,2.1850,2.2923, 2.3417,2.3608,2.3750,2.3797
	VBATT(1, 2,1)	1.9808,1.9997,2.0187,2.1992,2.3085, 2.3531,2.3702,2.3845,2.3892
	VBATT(1, 3,1)	1.9997,2.0187,2.0378,2.2230,2.3151, 2.3626,2.3797,2.3940,2.3988
	VBATT(1, 4,1)	2.0187,2.0378,2.0567,2.2467,2.3275, 2.3702,2.3892,2.4035,2.4083
	VBATT(1, 5,1)	2.0473,2.0662,2.0871,2.2562,2.3370, 2.3769,2.3940,2.4083,2.4130
	VBATT(1, 6,1)	2.0757,2.0948,2.1090,2.2705,2.3465, 2.3864,2.4073,2.4215,2.4263
	VBATT(1, 7,1)	2.1137,2.1328,2.1660,2.2781,2.3541, 2.3921,2.4177,2.4320,2.4367
	VBATT(1, 8,1)	2.1517,2.1707,2.2050,2.2895,2.3579, 2.3988,2.4272,2.4415,2.4462
	VBATT(1, 9,1)	2.1802,2.1992,2.2325,2.3123,2.3731, 2.4111,2.4415,2.4557,2.4605
	VBATT(1,10,1)	2.2078,2.2268,2.2610,2.3341,2.3873, 2.4225,2.4557,2.4700,2.4747
	VBATT(1,11,1)	2.2372,2.2562,2.2914,2.3550,2.4006, 2.4320,2.4700,2.4843,2.4890
	VBATT(1,12,1)	2.2657,2.2847,2.3218,2.3750,2.4130, 2.4405,2.4843,2.4985,2.5032
	VBATT(1,13,1)	2.2752,2.2942,2.3322,2.3864,2.4292, 2.4662,2.5127,2.5270,2.5317
	VBATT(1,14,1)	2.2942,2.3133,2.3417,2.3988,2.4386, 2.4814,2.5412,2.5555,2.5602
	VBATT(1,15,1)	2.2990,2.3180,2.3465,2.4035,2.4519, 2.5270,2.6410,2.6552,2.6600
	VBATT(1,16,1)	2.3038,2.3227,2.3512,2.4083,2.4652, 2.5726,2.7407,2.7550,2.7598
	VBATT(1,17,1)	2.3133,2.3322,2.3589,2.4130,2.4710, 2.5944,2.7882,2.8025,2.8072

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	VBATT(1,18,1)	2.3227,2.3417,2.3655,2.4177,2.4766, 2.6172,2.8358,2.8500,2.8547
	VBATT(1,19,1)	2.3417,2.3608,2.3797,2.4254,2.4938, 2.6349,2.8547,2.8690,2.8738
	VBATT(1,20,1)	2.3474,2.3664,2.3864,2.4301,2.4994, 2.6495,2.8642,2.8785,2.8832
	VBATT(1,21,1)	2.3608,2.3797,2.4003,2.4425,2.5127, 2.6714,2.8738,2.8880,2.8927
	VBATT(1, 1,2)	1.8953,1.9142,1.9332,2.1185,2.2258, 2.2752,2.2942,2.3085,2.3133
	VBATT(1, 2,2)	1.9142,1.9332,1.9523,2.1328,2.2420, 2.2667,2.3038,2.3180,2.3227
	VBATT(1, 3,2)	1.9332,1.9523,1.9712,2.1565,2.2487, 2.2961,2.3133,2.3275,2.3322
	VBATT(1, 4,2)	1.9523,1.9712,1.9902,2.1802,2.2610, 2.3038,2.3227,2.3370,2.3417
	VBATT(1, 5,2)	1.9808,1.9997,2.0206,2.1897,2.2705, 2.3104,2.3275,2.3417,2.3465
	VBATT(1, 6,2)	2.0093,2.0282,2.0425,2.2040,2.2800, 2.3199,2.3408,2.3550,2.3598
	VBATT(1, 7,2)	2.0473,2.0662,2.0995,2.2116,2.2876, 2.3256,2.3512,2.3655,2.3702
	VBATT(1, 8,2)	2.0852,2.1042,2.1384,2.2230,2.2914, 2.3322,2.3608,2.3750,2.3797
	VBATT(1, 9,2)	2.1137,2.1328,2.1660,2.2458,2.3066, 2.3446,2.3750,2.3892,2.3940
	VBATT(1,10,2)	2.1413,2.1603,2.1945,2.2676,2.3208, 2.3560,2.3892,2.4035,2.4083
	VBATT(1,11,2)	2.1707,2.1897,2.2249,2.2885,2.3341, 2.3655,2.4035,2.4177,2.4225
	VBATT(1,12,2)	2.1992,2.2183,2.2553,2.3085,2.3465, 2.3740,2.4177,2.4320,2.4367
	VBATT(1,13,2)	2.2087,2.2278,2.2657,2.3199,2.3626, 2.3997,2.4462,2.4605,2.4652
	VBATT(1,14,2)	2.2278,2.2467,2.2752,2.3322,2.3722, 2.4149,2.4747,2.4890,2.4938
	VBATT(1,15,2)	2.2325,2.2515,2.2800,2.3370,2.3855, 2.4605,2.5745,2.5887,2.5935
	VBATT(1,16,2)	2.2372,2.2562,2.2847,2.3417,2.3988, 2.5061,2.6742,2.6885,2.6933
	VBATT(1,17,2)	2.2467,2.2657,2.2923,2.3465,2.4044, 2.5280,2.7217,2.7360,2.7407
	VBATT(1,18,2)	2.2562,2.2752,2.2990,2.3512,2.4101, 2.5507,2.7692,2.7835,2.7882
	VBATT(1,19,2)	2.2752,2.2942,2.3133,2.3589,2.4272, 2.5678,2.7882,2.8025,2.8072
	VBATT(1,20,2)	2.2809,2.3000,2.3199,2.3636,2.4329, 2.5831,2.7977,2.8120,2.8167
	VBATT(1,21,2)	2.2942,2.3133,2.3341,2.3759,2.4462, 2.6049,2.8072,2.8215,2.8262
	VBATT(1, 1,3)	1.6625,1.6815,1.7005,1.8857,1.9931, 2.0475,2.0615,2.0757,2.0805

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	VBATT(1, 2,3)	1.6815,1.7005,1.7195,1.9000,2.0093, 2.0539,2.0710,2.0852,2.0900
	VBATT(1, 3,3)	1.7005,1.7195,1.7385,1.9237,2.0159, 2.0634,2.0805,2.0948,2.0995
	VBATT(1, 4,3)	1.7195,1.7385,1.7575,1.9475,2.0282, 2.0710,2.0900,2.1042,2.1090
	VBATT(1, 5,3)	1.7480,1.7670,1.7879,1.9570,2.0378, 2.0777,2.0948,2.1090,2.1137
	VBATT(1, 6,3)	1.7765,1.7955,1.8098,1.9712,2.0473, 2.0871,2.1080,2.1223,2.1270
	VBATT(1, 7,3)	1.8145,1.8335,1.8668,1.9789,2.0548, 2.0928,2.1185,2.1328,2.1375
	VBATT(1, 8,3)	1.8525,1.8715,1.9057,1.9902,2.0586, 2.0995,2.1280,2.1423,2.1470
	VBATT(1, 9,3)	1.8810,1.9000,1.9332,2.0130,2.0738, 2.1118,2.1423,2.1565,2.1612
	VBATT(1,10,3)	1.9086,1.9276,1.9618,2.0349,2.0881, 2.1233,2.1565,2.1707,2.1755
	VBATT(1,11,3)	1.9380,1.9570,1.9922,2.0558,2.1014, 2.1328,2.1707,2.1850,2.1897
	VBATT(1,12,3)	1.9665,1.9855,2.0225,2.0757,2.1137, 2.1413,2.1850,2.1992,2.2040
	VBATT(1,13,3)	1.9760,1.9950,2.0330,2.0871,2.1299, 2.1669,2.2135,2.2278,2.2325
	VBATT(1,14,3)	1.9950,2.0140,2.0425,2.0995,2.1394, 2.1821,2.2420,2.2562,2.2610
	VBATT(1,15,3)	1.9997,2.0187,2.0473,2.1042,2.1527, 2.2278,2.3417,2.3560,2.3608
	VBATT(1,16,3)	2.0045,2.0235,2.0520,2.1090,2.1660, 2.2734,2.4415,2.4557,2.4605
	VBATT(1,17,3)	2.0140,2.0330,2.0596,2.1137,2.1717, 2.2952,2.4890,2.5032,2.5080
	VBATT(1,18,3)	2.0235,2.0425,2.0662,2.1185,2.1774, 2.3180,2.5365,2.5507,2.5555
	VBATT(1,19,3)	2.0425,2.0615,2.0805,2.1261,2.1945, 2.3351,2.5555,2.5698,2.5745
	VBATT(1,20,3)	2.0482,2.0672,2.0871,2.1308,2.2002, 2.3503,2.5650,2.5793,2.5840
	VBATT(1,21,3)	2.0615,2.0805,2.1014,2.1432,2.2135, 2.3722,2.5745,2.5887,2.5935
	VBATT(1, 1,4)	1.5960,1.6150,1.6340,1.8193,1.9266, 1.9760,1.9950,2.0093,2.0140
	VBATT(1, 2,4)	1.6150,1.6340,1.6530,1.8335,1.9427, 1.9874,2.0045,2.0187,2.0235
	VBATT(1, 3,4)	1.6340,1.6530,1.6720,1.8572,1.9494, 1.9969,2.0140,2.0282,2.0330
	VBATT(1, 4,4)	1.6530,1.6720,1.6910,1.8810,1.9618, 2.0045,2.0235,2.0378,2.0425
	VBATT(1, 5,4)	1.6815,1.7005,1.7214,1.8905,1.9712, 2.0112,2.0282,2.0425,2.0473
	VBATT(1, 6,4)	1.7100,1.7290,1.7432,1.9047,1.9808, 2.0206,2.0415,2.0558,2.0606

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	VBATT(1, 7,4)	1.7480,1.7670,1.8002,1.9129,1.9883, 2.0263,2.0520,2.0662,2.0710
	VBATT(1, 8,4)	1.7860,1.8050,1.8392,1.9237,1.9922, 2.0330,2.0615,2.0757,2.0805
	VBATT(1, 9,4)	1.8145,1.8335,1.8668,1.9465,2.0073, 2.0453,2.0757,2.0900,2.0948
	VBATT(1,10,4)	1.8421,1.8611,1.8953,1.9684,2.0216, 2.0567,2.0900,2.1042,2.1090
	V3ATT(1,11,4)	1.8715,1.8905,1.9257,1.9893,2.0349, 2.0662,2.1042,2.1185,2.1233
	VBATT(1,12,4)	1.9000,1.9190,1.9560,2.0093,2.0473, 2.0748,2.1185,2.1328,2.1375
	VBATT(1,13,4)	1.9095,1.9285,1.9665,2.0206,2.0634, 2.1004,2.1470,2.1612,2.1660
	VBATT(1,14,4)	1.9285,1.9475,1.9760,2.0330,2.0729, 2.1156,2.1755,2.1897,2.1945
	VBATT(1,15,4)	1.9332,1.9523,1.9808,2.0378,2.0862, 2.1612,2.2752,2.2895,2.2942
	VBATT(1,16,4)	1.9380,1.9570,1.9855,2.0425,2.0995, 2.2068,2.3750,2.3892,2.3940
	V3ATT(1,17,4)	1.9475,1.9665,1.9931,2.0473,2.1052, 2.2287,2.4225,2.4367,2.4415
	VBATT(1,18,4)	1.9570,1.9760,1.9997,2.0520,2.1109, 2.2515,2.4700,2.4843,2.4890
	VBATT(1,19,4)	1.9760,1.9950,2.0140,2.0596,2.1280, 2.2686,2.4890,2.5032,2.5080
	V3ATT(1,20,4)	1.9817,2.0007,2.0206,2.0644,2.1337, 2.2838,2.4985,2.5127,2.5175
	VBATT(1,21,4)	1.9950,2.0140,2.0349,2.0767,2.1470, 2.3056,2.5080,2.5222,2.5270
	VBATT(1, 1,5)	1.5295,1.5485,1.5675,1.7527,1.8601, 1.9095,1.9285,1.9427,1.9475
	VBATT(1, 2,5)	1.5485,1.5675,1.5865,1.7670,1.8762, 1.9209,1.9380,1.9523,1.9570
	V3ATT(1, 3,5)	1.5675,1.5865,1.6055,1.7907,1.8829, 1.9304,1.9475,1.9618,1.9665
	VBATT(1, 4,5)	1.5865,1.6055,1.6245,1.8145,1.8953, 1.9380,1.9570,1.9712,1.9760
	VBATT(1, 5,5)	1.6150,1.6340,1.6549,1.8240,1.9047, 1.9446,1.9618,1.9760,1.9808
	VBATT(1, 6,5)	1.6435,1.6625,1.6768,1.8382,1.9142, 1.9542,1.9751,1.9893,1.9941
	V3ATT(1, 7,5)	1.6815,1.7005,1.7338,1.8459,1.9218, 1.9598,1.9855,1.9997,2.0045
	V3ATT(1, 8,5)	1.7195,1.7385,1.7727,1.8572,1.9257, 1.9665,1.9950,2.0093,2.0140
	V3ATT(1, 9,5)	1.7480,1.7670,1.8002,1.8801,1.9409, 1.9789,2.0093,2.0235,2.0282
	VBATT(1,10,5)	1.7756,1.7946,1.8287,1.9019,1.9551, 1.9902,2.0235,2.0378,2.0425
	V3ATT(1,11,5)	1.8050,1.8240,1.8592,1.9228,1.9684, 1.9997,2.0378,2.0520,2.0567

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	VBATT(1,12,5)	1.8335,1.8525,1.8895,1.9427,1.9808, 2.0083,2.0520,2.0662,2.0710
	VBATT(1,13,5)	1.8430,1.8620,1.9000,1.9542,1.9969, 2.0340,2.0805,2.0948,2.0995
	VBATT(1,14,5)	1.8620,1.8810,1.9095,1.9665,2.0064, 2.0491,2.1090,2.1233,2.1280
	VBATT(1,15,5)	1.8668,1.8857,1.9142,1.9712,2.0197, 2.0948,2.2087,2.2230,2.2278
	VBATT(1,16,5)	1.8715,1.8905,1.9190,1.9760,2.0330, 2.1403,2.3085,2.3227,2.3275
	VBATT(1,17,5)	1.8810,1.9000,1.9266,1.9808,2.0387, 2.1622,2.3560,2.3702,2.3750
	VBATT(1,18,5)	1.8905,1.9095,1.9332,1.9855,2.0444, 2.1850,2.4035,2.4177,2.4225
	VBATT(1,19,5)	1.9095,1.9285,1.9475,1.9931,2.0615, 2.2021,2.4225,2.4367,2.4415
	VBATT(1,20,5)	1.9152,1.9342,1.9542,1.9978,2.0672, 2.2173,2.4320,2.4462,2.4510
	VBATT(1,21,5)	1.9285,1.9475,1.9684,2.0102,2.0805, 2.2391,2.4415,2.4557,2.4605
	VBATT(1, 1,6)	1.4297,1.4488,1.4677,1.6530,1.7609, 1.8098,1.8287,1.8430,1.8477
	VBATT(1, 2,6)	1.4488,1.4677,1.4867,1.6672,1.7765, 1.8211,1.8382,1.8525,1.8572
	VBATT(1, 3,6)	1.4677,1.4867,1.5057,1.6910,1.7832, 1.8307,1.8477,1.8620,1.8668
	VBATT(1, 4,6)	1.4867,1.5057,1.5247,1.7148,1.7955, 1.8382,1.8572,1.8715,1.8762
	VBATT(1, 5,6)	1.5152,1.5342,1.5551,1.7242,1.8050, 1.8449,1.8620,1.8762,1.8810
	VBATT(1, 6,6)	1.5438,1.5627,1.5770,1.7385,1.8145, 1.8544,1.8753,1.8895,1.8943
	VBATT(1, 7,6)	1.5818,1.6007,1.6340,1.7461,1.8221, 1.8601,1.8857,1.9000,1.9047
	VBATT(1, 8,6)	1.6197,1.6387,1.6729,1.7575,1.8259, 1.8668,1.8953,1.9095,1.9142
	VBATT(1, 9,6)	1.6482,1.6672,1.7005,1.7803,1.8411, 1.8791,1.9095,1.9237,1.9285
	VBATT(1,10,6)	1.6758,1.6948,1.7290,1.8021,1.8553, 1.8905,1.9237,1.9380,1.9427
	VBATT(1,11,6)	1.7052,1.7242,1.7594,1.8230,1.8686, 1.9000,1.9380,1.9523,1.9570
	VBATT(1,12,6)	1.7338,1.7527,1.7898,1.8430,1.8810, 1.9086,1.9523,1.9665,1.9712
	VBATT(1,13,6)	1.7432,1.7623,1.8002,1.8544,1.8971, 1.9342,1.9808,1.9950,1.9997
	VBATT(1,14,6)	1.7623,1.7812,1.8098,1.8668,1.9066, 1.9494,2.0093,2.0235,2.0282
	VBATT(1,15,6)	1.7670,1.7860,1.8145,1.8715,1.9199, 1.9950,2.1090,2.1233,2.1280
	VBATT(1,16,6)	1.7717,1.7907,1.8193,1.8762,1.9332, 2.0406,2.2087,2.2230,2.2278

TABLE 2-3.-DEFAULT DATA FOR LEAD/ACID BATTERY SYSTEM (contd)

VARIABLE	DIMENSIONS	DEFAULT VALUE
	VBATT(1,17,6)	1.7812,1.8002,1.8268,1.8810,1.9390, 2.0624,2.2562,2.2705,2.2752
	VBATT(1,18,6)	1.7907,1.8098,1.8335,1.8857,1.9446, 2.0852,2.3038,2.3180,2.3227
	VBATT(1,19,6)	1.8098,1.8287,1.8477,1.8934,1.9618, 2.1023,2.3227,2.3370,2.3417
	VBATT(1,20,6)	1.8154,1.8344,1.8544,1.8981,1.9675, 2.1175,2.3322,2.3465,2.3512
	VBATT(1,21,6)	1.8287,1.8477,1.8686,1.9105,1.9808, 2.1394,2.3417,2.3560,2.3608
VV	(30)	0.59540, 0.57200, 0.54640, 0.52260, 0.50900, 0.48590, 0.47306, 0.46026, 0.44743, 0.43461, 0.42179, 0.40897, 0.39743, 0.38461, 0.37179, 0.35897, 0.34615, 0.33333, 0.32051, 0.30769, 0.29467, 0.23077, 0.16667, 0.10256, 0.03846, 0.0, -0.06410, -0.12820, -0.19231, -0.25641
XIBATT	(9)	-1.0, -0.1, -0.05, 0.0, 0.05, 0.1, 0.2, 0.5, 1.0
XII	(30)	-0.30900, -0.293698, -0.106502, -0.042848, 0.0, 0.045521, 0.068053, 0.085984, 0.099321, 0.109896, 0.118172, 0.124156, 0.128286, 0.131510, 0.134271, 0.136104, 0.137669, 0.138772, 0.139606, 0.140152, 0.140564, 0.141491, 0.141851, 0.142129, 0.142407, 0.142593, 0.142681, 0.143159, 0.143448, 0.143726

3. DSPA OUTPUT

There are two kinds of outputs generated by the DPSA program: tabular printout and graphical output. The tabular output consists of a number of 132-character lines arranged in various tables depending on which of the Design Synthesis/Performance Analysis routines are being executed. The graphical output is produced only for Performance Analysis runs and consists of current vs. voltage plots and/or summary performance plots. In addition, there are several program termination/error messages which may be displayed. These error-exit messages will indicate whether the cause of the problem was invalid input data, read or write difficulties, or computational (failure to converge, etc.).

3.1 Design Synthesis Output

Output from the Design Synthesis portion of the DSPA program is in the form of four tables. The first table provides an overview of the solar array/battery power system design, including load and system requirements and subsystem procurement quantities, costs, and weights. The second table gives more detailed engineering information for the power source and energy storage groups. The third table lists additional battery performance data. The fourth table contains power load profile analysis information. All of the Design Synthesis output are very straightforward; each table is labeled, and each printed data item is accompanied by a description and the units associated with the variable. A sample set of Design Synthesis output is provided in Figure 3-1.

3.2 Performance Analysis Output

There are three types of outputs associated with the Performance Analysis portion of the DSPA program: optional "instantaneous" I-V plots, summary plots, and summary printout. The "instantaneous" I-V plots are generated only if the user sets NPLT > 0 in the namelist input. These plots show the current vs. voltage curves of the several power system elements (solar array, shunt limiter, batteries, etc.) at a particular "instant" in time. A sample I-V plot is included as part of Figure 3-2.

The Performance Analysis summary output consists of three print tables and their corresponding plots. All of the summary tables and plots present a number of items of information as a function of the time since the start of the test (START(i)). The first table (there is no plot associated with this table) presents summary data for the unregulated bus system. The second table and its corresponding plot show Power Source Group summary data. The third table and its associated plot give summary data for the batteries and Energy Storage Unit. The printed output is arranged in tabular format giving each data item's description and units. The data is presented in sequential order starting from zero elapsed time to the final time elapsed since the start of the test based on the accumulation of all of the user-input duration steps (DURA(i)). A sample set of Performance Analysis output is provided in Figure 3-2 along with summary plots corresponding to the tabular printout.

NAVIGATION AID POWER SYSTEM DESIGN CHARACTERISTICS DS-PAGE 01

MISSION DURATION =	.6000+01 YEARS	BUOY LATITUDE =	.3393+02 DEGREES
DESIGN PERIOD =	52 WEEKS	BUOY LONGITUDE =	.1184+03 DEGREES
NOMINAL OPERATING VOLTAGE =	.1200+02 VOLTS	TIME ZONE NUMBER =	.8000+01
SOLAR ARRAY SURFACE TILT ANGLE =	.0000 DEGREES	AVERAGE YEARLY TEMPERATURE =	.5890+02 DEG. FAHRENHEIT
SOLAR ARRAY SURFACE AZIMUTH ANGLE =	.0000 DEGREES	MAXIMUM AMBIENT TEMPERATURE =	.8346+02 DEG. FAHRENHEIT
		MINIMUM AMBIENT TEMPERATURE =	.4066+02 DEG. FAHRENHEIT

DESIGN PERIOD LOAD ENERGY REQUIREMENTS (WATT-HOURS)

FOR SOLAR OCCULTATION: .3191+04 FOR SHARE-MODE OPERATION: .1748+01 FOR BATTERY-CHARGING PERIODS: .2022+03

USER SYSTEM REQUIREMENTS

FLASHER PATTERN TYPE = 3
FLASHER PATTERN = .4, 3.6,

SOLAR INSOLATION LEVEL FOR LAMP-FLASHER TURN-ON =	.1386+00	WATTS/SQ.METER
SOLAR INSOLATION LEVEL FOR LAMP-FLASHER TURN-OFF =	.6932+00	WATTS/SQ.METER
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-FLASHING CURRENT =	.6122-01	AMPERES
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-OFF CURRENT =	.3780-02	AMPERES
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-FLASHING LOAD =	.7346+00	WATTS
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-OFF LOAD =	.4537-01	WATTS

INDIVIDUAL POWER SYSTEM CHARATERISTICS

SUBSYSTEM	TYPE	NO. TO BE PROCURED	WEIGHT (POUNDS)	AREA (SQ. FEET)	COST ($)
POWER SOURCE GROUP	0				
SOLAR ARRAY		1000	.1993+01	.7381+00	.1652+03
SHUNT LIMITER	0	0	.0000		.0000
ENERGY STORAGE GROUP					
BATTERY		1000	.1219+03		.3165+05
CHARGER	0	0	.0000		.0000
TOTALS			.1238+03		.3182+05

FIGURE 3-1. SAMPLE OUTPUT FOR DESIGN SYNTHESIS (Sheet 1 of 4)

SUMMARY OF ENGINEERING DESIGN DATA
FOR NAVIGATION AID POWER SYSTEM

DS-PAGE 02

MISSION DURATION =	.6000*01	YEARS	POWER SOURCE GROUP ENERGY REQUIREMENT =	.9256*09	WATT-HOURS
DESIGN PERIOD =	52	WEEKS	SOLAR ARRAY ENERGY REQUIREMENT =	.9610*09	WATT-HOURS
MAXIMUM SOLAR RADIATION =	.9652*03	WATTS/SQ.METER	MAXIMUM SOLAR ARRAY POWER =	.5348*01	WATTS
TOTAL DESIGN PERIOD SOLAR RADIATION =	.1772*07	WATT-HOURS/SQ.METER	AVERAGE POWER SOURCE GROUP POWER =	.9549*00	WATTS

POWER SOURCE GROUP

SOLAR ARRAY:

AREA OF A SINGLE SOLAR CELL =	.4000*01	SQ.CENTIMETERS
NO. OF SOLAR CELLS IN PARALLEL =	1	
NO. OF SOLAR CELLS IN SERIES =	30	
NO. OF ELECTRICAL SECTIONS IN PARALLEL =	4	
TOTAL NO. OF SOLAR CELLS =	120	
SOLAR ARRAY RESERVE FRACTION =	.2000*00	
ELECTRICAL SECTION BLOCKING DIODE RATING =	.1028*00	WATTS

SHUNT LIMITER:

TYPE OF SHUNT LIMITER =	0	

ENERGY STORAGE GROUP

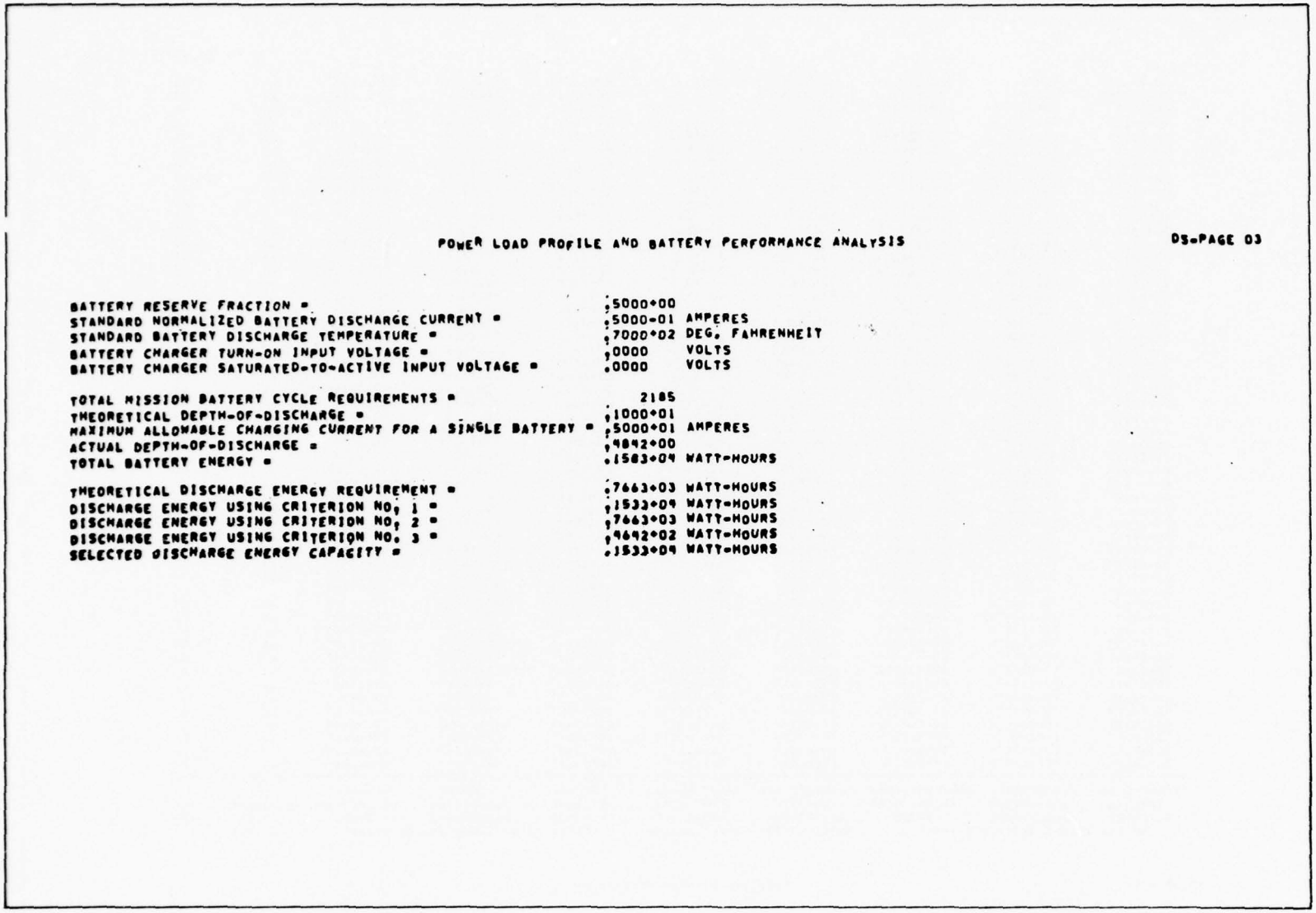
BATTERY:

NO. OF STORAGE CELLS IN SERIES =	6	
NO. OF BATTERIES IN PARALLEL =	3	
BATTERY RESERVE FRACTION =	.5000*00	
DISCHARGE CAPACITY FOR A SINGLE BATTERY =	.5000*02	AMP-HOURS
TOTAL DISCHARGE CAPACITY FOR ALL BATTERIES =	.1500*03	AMP-HOURS
MAXIMUM CHARGING CURRENT FOR A SINGLE BATTERY =	.5000*01	AMPERES
TOTAL BATTERY ENERGY =	.1583*04	WATT-HOURS

CHARGER:

TYPE OF CHARGER =	0	
MAXIMUM LOAD FOR A SINGLE CHARGER =	.0000	WATTS

FIGURE 3-1. SAMPLE OUTPUT FOR DESIGN SYNTHESIS (Sheet 2 of 4)



POWER LOAD PROFILE AND BATTERY PERFORMANCE ANALYSIS DS-PAGE 03

BATTERY RESERVE FRACTION =	.5000+00	
STANDARD NORMALIZED BATTERY DISCHARGE CURRENT =	.5000-01	AMPERES
STANDARD BATTERY DISCHARGE TEMPERATURE =	.7000+02	DEG. FAHRENHEIT
BATTERY CHARGER TURN-ON INPUT VOLTAGE =	.0000	VOLTS
BATTERY CHARGER SATURATED-TO-ACTIVE INPUT VOLTAGE =	.0000	VOLTS
TOTAL MISSION BATTERY CYCLE REQUIREMENTS =	2185	
THEORETICAL DEPTH-OF-DISCHARGE =	.1000+01	
MAXIMUM ALLOWABLE CHARGING CURRENT FOR A SINGLE BATTERY =	.5000+01	AMPERES
ACTUAL DEPTH-OF-DISCHARGE =	.4842+00	
TOTAL BATTERY ENERGY =	.1583+04	WATT-HOURS
THEORETICAL DISCHARGE ENERGY REQUIREMENT =	.7663+03	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 1 =	.1533+04	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 2 =	.7663+03	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 3 =	.4692+02	WATT-HOURS
SELECTED DISCHARGE ENERGY CAPACITY =	.1533+04	WATT-HOURS

FIGURE 3-1. SAMPLE OUTPUT FOR DESIGN SYNTHESIS (Sheet 3 of 4)

POWER LOAD PROFILE ANALYSIS DS-PAGE 04

WEEK INDEX	NO. OF MODE REVERSALS	WEEKLY DURATION OF SOLAR OCCULTATION (HOURS)	WEEKLY DURATION OF SHARE-MODE OPERATIONS (HOURS)	WEEKLY DURATION OF CHARGING PERIODS (HOURS)	WEEKLY TOTAL OF SOLAR INSOLATION (WT-HRS/SQ.M)	WEEKLY SOLAR INSOLATION MAXIMUM (WT-HRS/SQ.M)	BATTERY DISCHARGE ENERGY DURING SOLAR OCCULTATION (WATT-HOURS)	BATTERY DISCHARGE ENERGY DURING SHARE-MODE OPERATIONS (WATT-HOURS)	BATTERY DISCHARGE ENERGY DURING CHARGING PERIODS (WATT-HOURS)
1	14	.9875+02	.5367-01	.6918+02	.1784+05	.5075+03	-.7255+02	-.3939-01	.2937+02
2	14	.9908+02	.5725-01	.6885+02	.1711+05	.5169+03	-.7279+02	-.4202-01	.2316+02
3	14	.9903+02	.4861-01	.6891+02	.2007+05	.5310+03	-.7275+02	-.3567-01	.2760+02
4	14	.9860+02	.5018-01	.6934+02	.1996+05	.5512+03	-.7243+02	-.3682-01	.2761+02
5	14	.9778+02	.5218-01	.7016+02	.1991+05	.5761+03	-.7183+02	-.3830-01	.2787+02
6	14	.9660+02	.4955-01	.7135+02	.2410+05	.6048+03	-.7097+02	-.3196-01	.3483+02
7	14	.9510+02	.4940-01	.7285+02	.2450+05	.6360+03	-.6987+02	-.3273-01	.3619+02
8	14	.9333+02	.4646-01	.7462+02	.2472+05	.6680+03	-.6856+02	-.3410-01	.3743+02
9	14	.9134+02	.3916-01	.7662+02	.2982+05	.7388+03	-.6710+02	-.2874-01	.4692+02
10	14	.8919+02	.4077-01	.7877+02	.3280+05	.8276+03	-.6552+02	-.2992-01	.5333+02
11	14	.8693+02	.4334-01	.8102+02	.3370+05	.8560+03	-.6386+02	-.3181-01	.5643+02
12	14	.8463+02	.3735-01	.8332+02	.3499+05	.8227+03	-.6217+02	-.2791-01	.6039+02
13	14	.8234+02	.3975-01	.8561+02	.3855+05	.9059+03	-.6049+02	-.2917-01	.6866+02
14	14	.8011+02	.4314-01	.8784+02	.3951+05	.9233+03	-.5885+02	-.3165-01	.7227+02
15	14	.7797+02	.3785-01	.8998+02	.3909+05	.8714+03	-.5728+02	-.2777-01	.7322+02
16	14	.7598+02	.4089-01	.9197+02	.4384+05	.9463+03	-.5581+02	-.3000-01	.8932+02
17	14	.7415+02	.4488-01	.9380+02	.4385+05	.9533+03	-.5447+02	-.3293-01	.8602+02
18	14	.7250+02	.3971-01	.9544+02	.4199+05	.8915+03	-.5326+02	-.2914-01	.8369+02
19	14	.7106+02	.4312-01	.9688+02	.4662+05	.9613+03	-.5220+02	-.3164-01	.9467+02
20	14	.6983+02	.4747-01	.9810+02	.4620+05	.9633+03	-.5130+02	-.3483-01	.9997+02
21	14	.6882+02	.4202-01	.9912+02	.4385+05	.8975+03	-.5056+02	-.3083-01	.9091+02
22	14	.6804+02	.4557-01	.9990+02	.4836+05	.9651+03	-.4998+02	-.3344-01	.1014+03
23	14	.6748+02	.5002-01	.1005+03	.4760+05	.9652+03	-.4957+02	-.3670-01	.1003+03
24	14	.6715+02	.4907-01	.1008+03	.4989+05	.8980+03	-.4933+02	-.3233-01	.9972+02
25	14	.6707+02	.4749-01	.1009+03	.4915+05	.9646+03	-.4927+02	-.3484-01	.1041+03
26	14	.6722+02	.5168-01	.1007+03	.4801+05	.9639+03	-.4938+02	-.3792-01	.1015+03
27	14	.6762+02	.4507-01	.1003+03	.4495+05	.8961+03	-.4967+02	-.3307-01	.9941+02
28	14	.6829+02	.4799-01	.9970+02	.4875+05	.9620+03	-.5013+02	-.3520-01	.1020+03
29	14	.6908+02	.5155-01	.9886+02	.4718+05	.9406+03	-.5075+02	-.3782-01	.9781+02
30	14	.7010+02	.4936-01	.9785+02	.4379+05	.8919+03	-.5150+02	-.3255-01	.8961+02
31	14	.7126+02	.4664-01	.9668+02	.4699+05	.9556+03	-.5235+02	-.3423-01	.9626+02
32	14	.7253+02	.4961-01	.9541+02	.4500+05	.9513+03	-.5328+02	-.3640-01	.8989+02
33	14	.7385+02	.4237-01	.9410+02	.4133+05	.8794+03	-.5425+02	-.3109-01	.8118+02
34	14	.7519+02	.4938-01	.9275+02	.4386+05	.9366+03	-.5524+02	-.3256-01	.8507+02
35	14	.7653+02	.4714-01	.9142+02	.4152+05	.9253+03	-.5622+02	-.3461-01	.7921+02
36	14	.7782+02	.4041-01	.9013+02	.3781+05	.8477+03	-.5717+02	-.2965-01	.7083+02
37	14	.7907+02	.4259-01	.8887+02	.3902+05	.8937+03	-.5809+02	-.3125-01	.7217+02
38	14	.8028+02	.4565-01	.8766+02	.3570+05	.8734+03	-.5898+02	-.3350-01	.6488+02
39	14	.8145+02	.3954-01	.8649+02	.3336+05	.7914+03	-.5984+02	-.2901-01	.5962+02
40	14	.8260+02	.4217-01	.8533+02	.3351+05	.8254+03	-.6068+02	-.3095-01	.5911+02
41	14	.8374+02	.4580-01	.8418+02	.2950+05	.7989+03	-.6152+02	-.3362-01	.5097+02
42	14	.8491+02	.4021-01	.8301+02	.2880+05	.7177+03	-.6238+02	-.2951-01	.4900+02
43	14	.8611+02	.4348-01	.8179+02	.2616+05	.6550+03	-.6326+02	-.3191-01	.4359+02
44	14	.8737+02	.4787-01	.8051+02	.2317+05	.6306+03	-.6418+02	-.3513-01	.3767+02
45	14	.8869+02	.4256-01	.7919+02	.2471+05	.6068+03	-.6516+02	-.3124-01	.3971+02
46	14	.9008+02	.4657-01	.7780+02	.2207+05	.5842+03	-.6617+02	-.3418-01	.3958+02
47	14	.9151+02	.5176-01	.7637+02	.1960+05	.5632+03	-.6722+02	-.3799-01	.3982+02
48	14	.9296+02	.4633-01	.7494+02	.2106+05	.5444+03	-.6829+02	-.3400-01	.3163+02
49	14	.9439+02	.5079-01	.7352+02	.1903+05	.5285+03	-.6934+02	-.3728-01	.2780+02
50	14	.9574+02	.5626-01	.7217+02	.1722+05	.5161+03	-.7033+02	-.4129-01	.2945+02
51	14	.9694+02	.4984-01	.7098+02	.1898+05	.5079+03	-.7122+02	-.3657-01	.2676+02
52	14	.9794+02	.5369-01	.6999+02	.1773+05	.5045+03	-.7196+02	-.3941-01	.2940+02

STOP DS/PA

FIGURE 3-1. SAMPLE OUTPUT FOR DESING SYNTHESIS (Sheet 4 of 4)

YEAR:	DAY:	HOUR	DAYSST	VBUS	XIPSG	XITT	XIPCD	QB
1975.:	1.:	.00	.000	10.328	.000	-.054	.054	.750
1975.:	1.:	4.00	.167	10.310	.000	-.054	.054	.745
1975.:	1.:	8.00	.333	11.698	.103	.099	.004	.741
1975.:	1.:	12.00	.500	12.247	1.120	1.116	.004	.775
1975.:	1.:	16.00	.667	11.682	.146	.143	.004	.788
1975.:	1.:	20.00	.833	10.212	.000	-.053	.053	.784
1975.:	2.:	4.00	1.167	10.326	.000	-.054	.054	.773
1975.:	2.:	8.00	1.333	11.719	.103	.099	.004	.769
1975.:	2.:	12.00	1.500	11.973	.659	.655	.004	.789
1975.:	2.:	16.00	1.667	11.642	.076	.073	.004	.797
1975.:	2.:	20.00	1.833	10.216	.000	-.053	.053	.792
1975.:	3.:	4.00	2.167	10.329	.000	-.054	.054	.782
1975.:	3.:	8.00	2.333	11.723	.102	.098	.004	.778
1975.:	3.:	12.00	2.500	11.986	.670	.666	.004	.798
1975.:	3.:	16.00	2.667	11.649	.081	.077	.004	.806
1975.:	3.:	20.00	2.833	10.220	.000	-.053	.053	.801
1975.:	3.:	24.00	3.000	10.277	.000	-.054	.054	.796

ARE SUMMARY OUTPUT TABLES DESIRED?

FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 1 of 9)

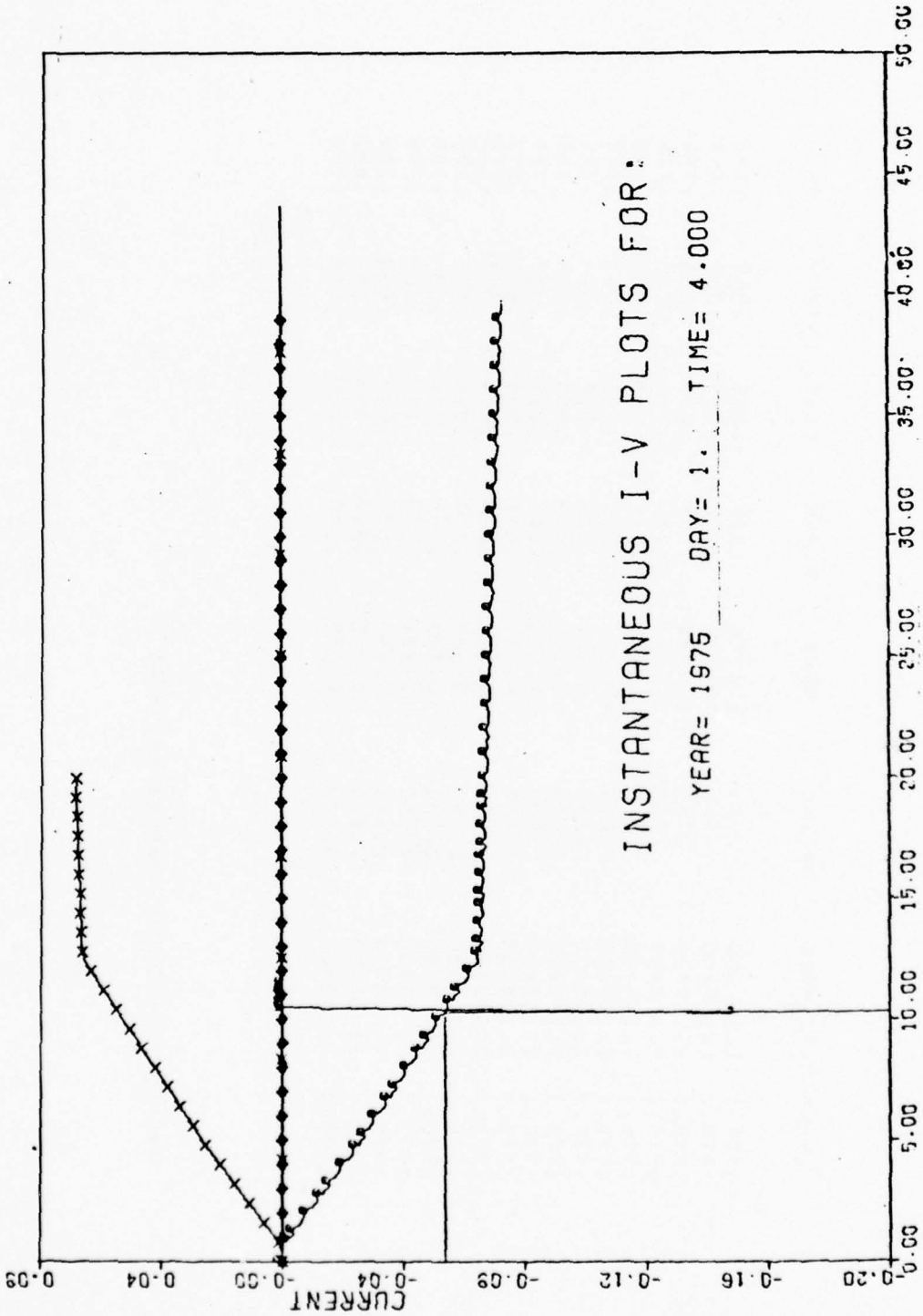


FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 2 of 9)

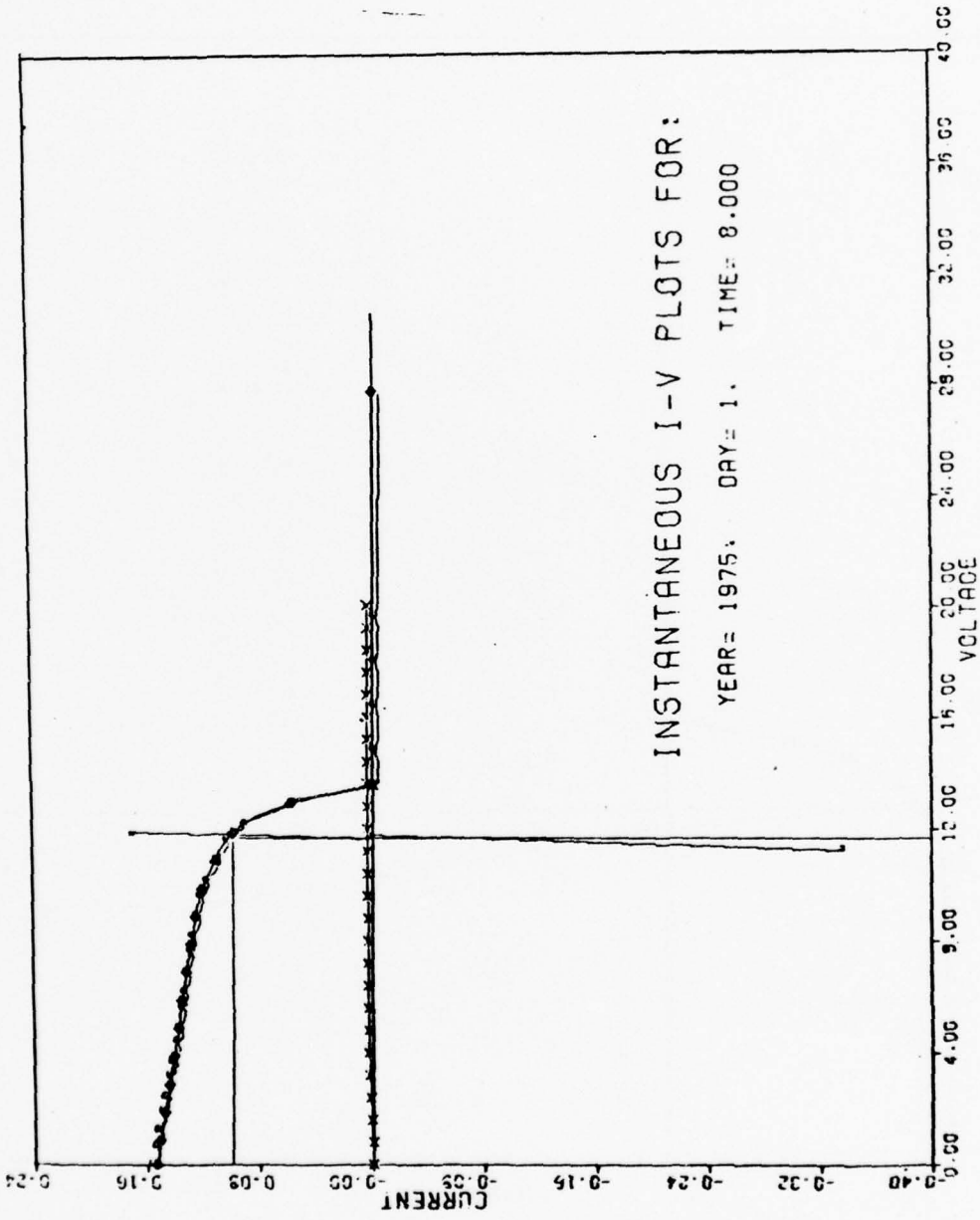


FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 3 of 9)

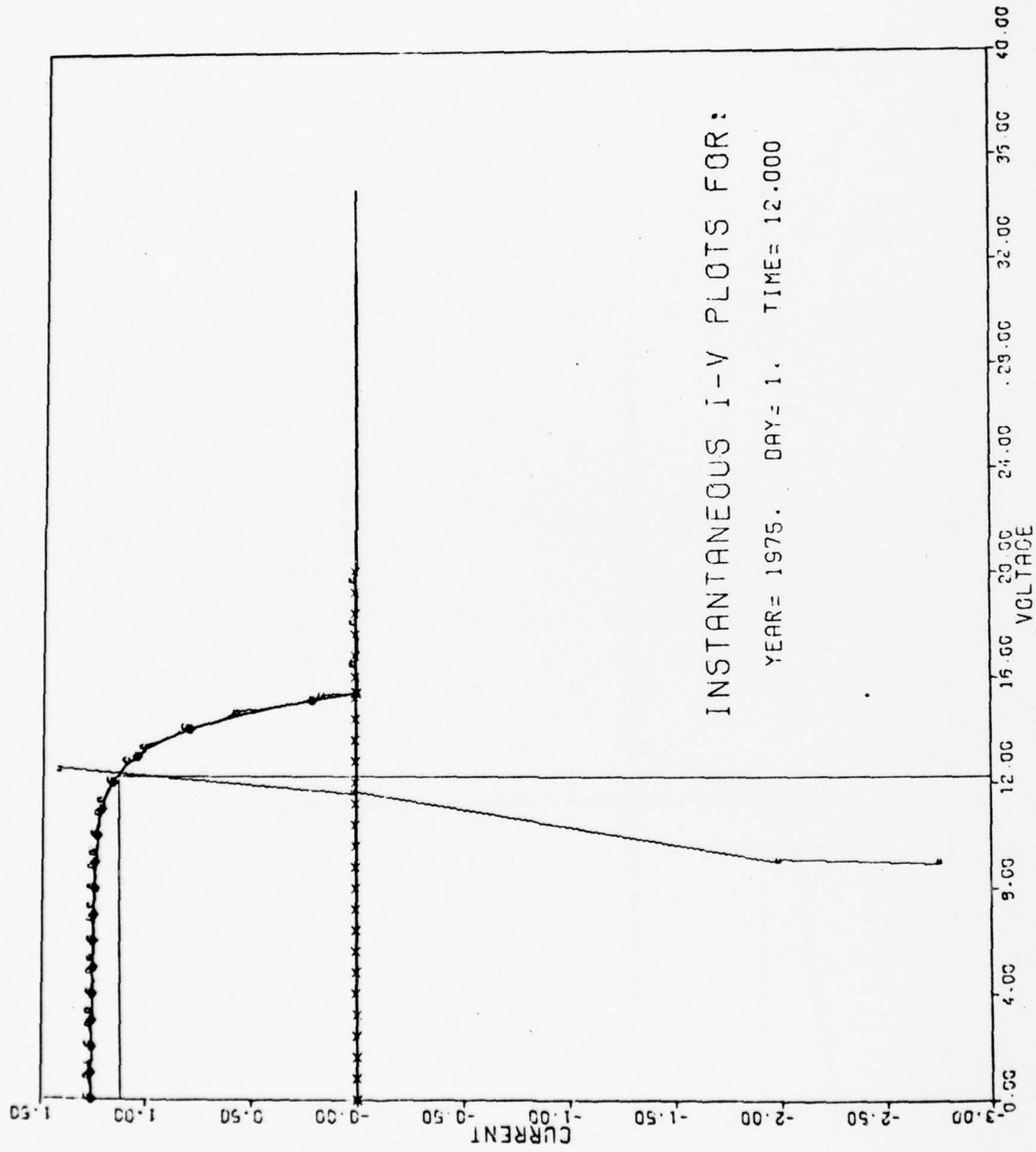


FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 4 of 9)

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS PAGE-PAGE 0001

TABLE 1: UNREGULATED BUS SUMMARY

DATE OF TEST YEAR:DAY:HOUR	TIME SINCE START (DAYS)	POWER SYSTEM OPERATING VOLTAGE (VOLTS)	POWER SOURCE GROUP POWER (WATTS)	POWER SOURCE GROUP CURRENT (AMPERES)	ENERGY STORAGE GROUP POWER (WATTS)	ENERGY STORAGE GROUP CURRENT (AMPERES)	POWER CONDITIONING AND DISTRIBUTION GROUP POWER (WATTS)	POWER CONDITIONING AND DISTRIBUTION GROUP CURRENT (AMPERES)
1975: 1: .00	.00	10.33	.0000	.0000	.5575+00	-.5398-01	.5575+00	.5398-01
1975: 1: 4.00	.17	10.31	.0000	.0000	.5556+00	-.5388-01	.5556+00	.5388-01
1975: 1: 8.00	.33	11.70	.1208+01	.1032+00	.1144+01	.9948-01	.4399-01	.3761-02
1975: 1:12.00	.50	12.25	.1371+02	.1120+01	.1367+02	.1116+01	.4649-01	.3796-02
1975: 1:16.00	.67	11.68	.1711+01	.1465+00	.1667+01	.1427+00	.4392-01	.3760-02
1975: 1:20.00	.83	10.21	.0000	.0000	.5450+00	-.5337-01	.5450+00	.5337-01
1975: 2: 4.00	1.17	10.33	.0000	.0000	.5572+00	-.5397-01	.5572+00	.5397-01
1975: 2: 8.00	1.33	11.72	.1204+01	.1027+00	.1160+01	.9898-01	.4409-01	.3762-02
1975: 2:12.00	1.50	11.97	.7890+01	.6590+00	.7845+01	.6553+00	.4529-01	.3779-02
1975: 2:16.00	1.67	11.69	.8906+00	.7649-01	.8968+00	.7274-01	.4374-01	.3757-02
1975: 2:20.00	1.83	10.22	.0000	.0000	.5455+00	-.5339-01	.5455+00	.5339-01
1975: 3: 4.00	2.17	10.33	.0000	.0000	.5576+00	-.5398-01	.5576+00	.5398-01
1975: 3: 8.00	2.33	11.72	.1199+01	.1018+00	.1150+01	.9807-01	.4411-01	.3762-02
1975: 3:12.00	2.50	11.99	.8025+01	.6696+00	.7980+01	.6658+00	.4530-01	.3779-02
1975: 3:16.00	2.67	11.65	.9390+00	.8061-01	.8952+00	.7685-01	.4377-01	.3758-02
1975: 3:20.00	2.83	10.22	.0000	.0000	.5459+00	-.5341-01	.5459+00	.5341-01
1975: 3:24.00	3.00	10.28	.0000	.0000	.5520+00	-.5371-01	.5520+00	.5371-01

FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 5 of 9)

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS PAGE-PAGE 0001

TABLE 2: POWER SOURCE GROUP SUMMARY

DATE OF TEST			TIME SINCE START	POWER SOURCE GROUP TEMP.	INCIDENT SOLAR RADIATION	SOLAR ARRAY					SHUNT LIMITER		
YEAR	DAY	HOUR	(DAYS)	(DEG. F)	(WATTS/SQ.M)	VOLTAGE (VOLTS)	CURRENT (AMPERES)	POWER (WATTS)	MAXIMUM POWER (WATTS)	POWER MARGIN (WATTS)	VOLTAGE (VOLTS)	CURRENT (AMPERES)	POWER (WATTS)
1975	1	.00	.00	63.59	.0000	.0000	.0000	.0000	.0000	.0000	.1033+02	.0000	.0000
1975	1	4.00	.17	64.26	.0000	.0000	.0000	.0000	.0000	.0000	.1031+02	.0000	.0000
1975	1	8.00	.33	75.96	.6656+02	.1230+02	.1032+00	.1270+01	.1285+01	.1513-01	.1170+02	.0000	.0000
1975	1	12.00	.50	82.26	.5735+03	.1299+02	.1120+01	.1455+02	.1455+02	-.1311-05	.1225+02	.0000	.0000
1975	1	16.00	.67	80.46	.8985+02	.1229+02	.1465+00	.1801+01	.1843+01	.4226-01	.1168+02	.0000	.0000
1975	1	20.00	.83	71.46	.0000	.0000	.0000	.0000	.0000	.0000	.1021+02	.0000	.0000
1975	2	4.00	1.17	64.28	.0000	.0000	.0000	.0000	.0000	.0000	.1033+02	.0000	.0000
1975	2	8.00	1.33	75.98	.6656+02	.1232+02	.1027+00	.1266+01	.1285+01	.1887-01	.1172+02	.0000	.0000
1975	2	12.00	1.50	82.28	.3447+03	.1267+02	.6590+00	.8351+01	.8357+01	.6579-02	.1197+02	.0000	.0000
1975	2	16.00	1.67	80.48	.5518+02	.1224+02	.7649-01	.9362+00	.1009+01	.6780-01	.1164+02	.0000	.0000
1975	2	20.00	1.83	71.48	.0000	.0000	.0000	.0000	.0000	.0000	.1022+02	.0000	.0000
1975	3	4.00	2.17	64.30	.0000	.0000	.0000	.0000	.0000	.0000	.1033+02	.0000	.0000
1975	3	8.00	2.33	76.00	.6618+02	.1233+02	.1018+00	.1255+01	.1275+01	.2017-01	.1172+02	.0000	.0000
1975	3	12.00	2.50	82.30	.3502+03	.1269+02	.6696+00	.8494+01	.8500+01	.6194-02	.1199+02	.0000	.0000
1975	3	16.00	2.67	80.50	.5727+02	.1225+02	.8061-01	.9872+00	.1050+01	.6265-01	.1165+02	.0000	.0000
1975	3	20.00	2.83	71.50	.0000	.0000	.0000	.0000	.0000	.0000	.1022+02	.0000	.0000
1975	3	24.00	3.00	67.90	.0000	.0000	.0000	.0000	.0000	.0000	.1028+02	.0000	.0000

FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 6 of 9)

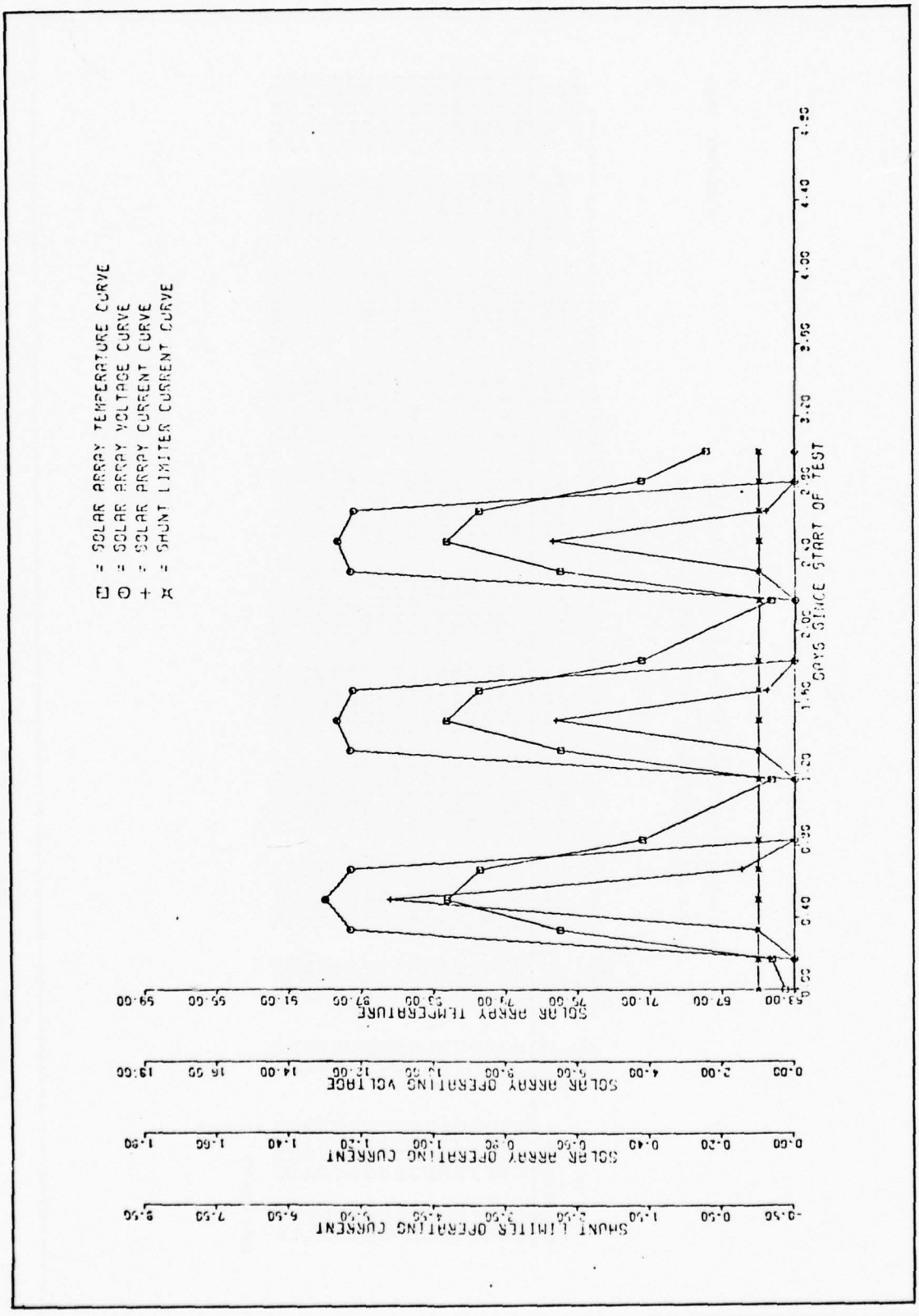


FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 7 of 9)

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS PA03-PAGE 0001

TABLE 031 ENERGY STORAGE UNIT SUMMARY, 2 BATTERIES

DATE OF TEST YEAR	DAY	HOUR	TIME SINCE START (DAYS)	ENERGY STORAGE GROUP TEMP. (DEG. F)	ENERGY STORAGE UNIT POWER (WATTS)	ENERGY STORAGE UNIT VOLTAGE (VOLTS)	BATTERY POWER (WATTS)	BATTERY CURRENT (AMPERES)	BATTERY VOLTAGE (VOLTS)	BATTERY STATE OF CHARGE	BATTERY CAPACITY (AMP-HOURS)	BATTERY SPECIFIC GRAVITY	BATTERY FREEZING TEMP. (DEG. F)
1975	1	.00	.00	58.59	.2802+00	.1033+02	.2797+00	-.2702-01	.1035+02	.7500+00	.1500+02	.1247+01	-.6139+02
1975	1	4.00	.17	59.26	.2794+00	.1031+02	.2788+00	-.2699-01	.1033+02	.7446+00	.1489+02	.1246+01	-.6000+02
1975	1	8.00	.33	70.96	.5816+00	.1170+02	.5045+00	.4972-01	.1015+02	.7411+00	.1482+02	.1245+01	-.5919+02
1975	1	12.00	.50	77.26	.6833+01	.1225+02	.5678+01	.5579+00	.1018+02	.7747+00	.1549+02	.1253+01	-.6744+02
1975	1	16.00	.67	75.46	.8331+00	.1168+02	.7209+00	.7131-01	.1011+02	.7883+00	.1577+02	.1255+01	-.7080+02
1975	1	20.00	.83	66.46	.2741+00	.1021+02	.2735+00	-.2673-01	.1023+02	.7836+00	.1567+02	.1254+01	-.6969+02
1975	2	0.00	1.17	59.28	.2803+00	.1033+02	.2797+00	-.2703-01	.1035+02	.7727+00	.1545+02	.1252+01	-.6696+02
1975	2	4.00	1.33	70.98	.5795+00	.1172+02	.5028+00	.4945-01	.1017+02	.7692+00	.1538+02	.1251+01	-.6610+02
1975	2	8.00	1.50	77.28	.3922+01	.1197+02	.3322+01	.3276+00	.1014+02	.7891+00	.1578+02	.1256+01	-.7101+02
1975	2	12.00	1.67	75.48	.9229+00	.1164+02	.3671+00	.3632-01	.1011+02	.7970+00	.1594+02	.1257+01	-.7296+02
1975	2	16.00	1.83	66.48	.2743+00	.1022+02	.2737+00	-.2674-01	.1024+02	.7923+00	.1585+02	.1256+01	-.7181+02
1975	2	20.00	2.00	59.30	.2809+00	.1033+02	.2799+00	-.2709-01	.1035+02	.7815+00	.1563+02	.1254+01	-.6913+02
1975	3	0.00	2.17	59.30	.2809+00	.1033+02	.2799+00	-.2709-01	.1035+02	.7815+00	.1563+02	.1254+01	-.6913+02
1975	3	4.00	2.33	71.00	.5743+00	.1172+02	.4984+00	.4899-01	.1017+02	.7780+00	.1556+02	.1253+01	-.6826+02
1975	3	8.00	2.50	77.30	.3989+01	.1199+02	.3377+01	.3328+00	.1015+02	.7981+00	.1596+02	.1258+01	-.7323+02
1975	3	12.00	2.67	75.50	.9470+00	.1165+02	.3880+00	.3838-01	.1011+02	.8061+00	.1612+02	.1259+01	-.7518+02
1975	3	16.00	2.83	66.50	.2743+00	.1022+02	.2737+00	-.2673-01	.1024+02	.8019+00	.1603+02	.1258+01	-.7409+02
1975	3	20.00	3.00	62.90	.2774+00	.1028+02	.2768+00	-.2688-01	.1030+02	.7960+00	.1592+02	.1257+01	-.7272+02

STOP DS/PA

FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 8 of 9)

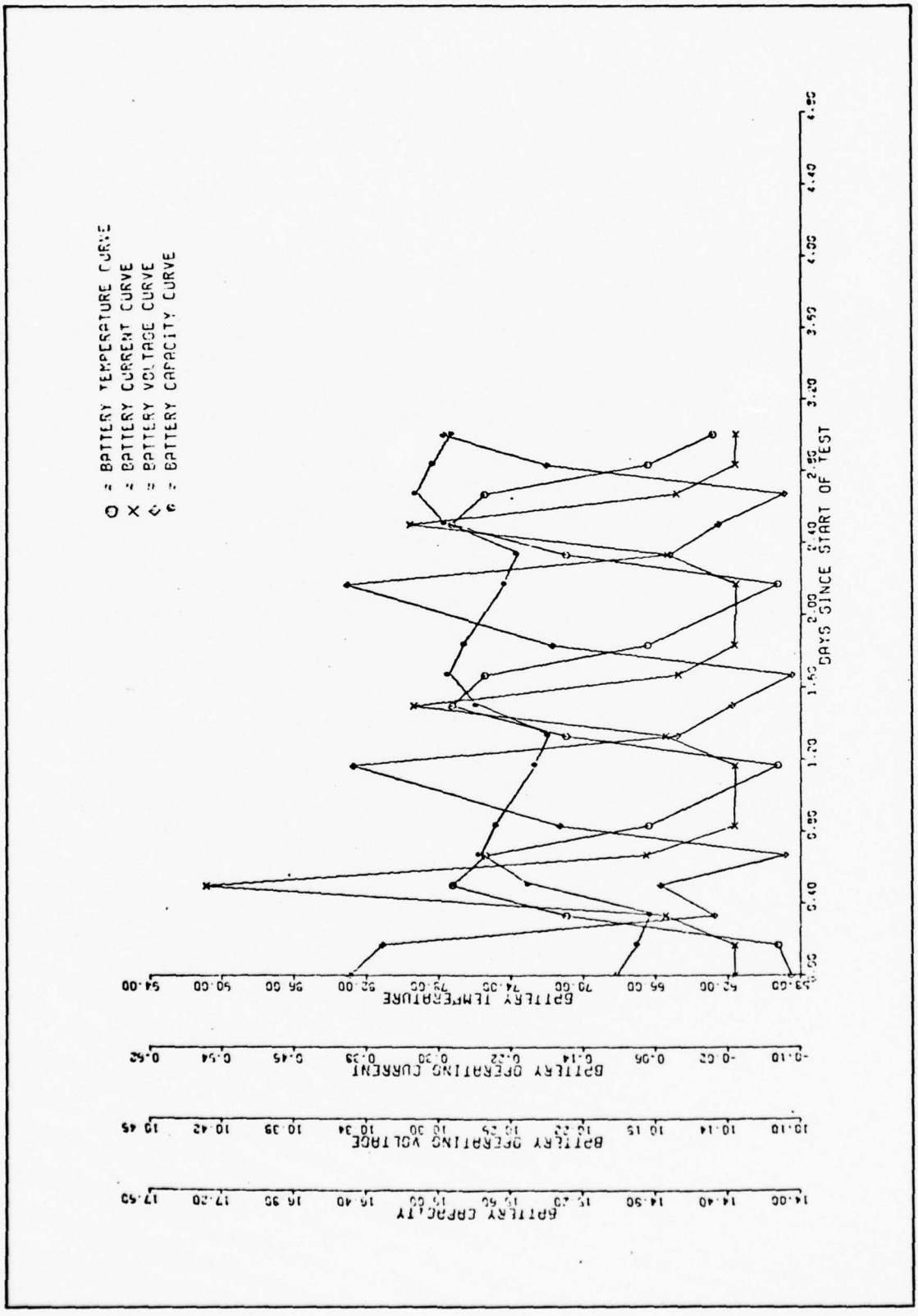


FIGURE 3-2. SAMPLE OUTPUT FOR PERFORMANCE ANALYSIS (Sheet 9 of 9)

4. DSPA SUPPORT PROGRAMS

As indicated in Section 2.1 above there are, in addition to manual entry, two alternate forms of weather data input available for use with the DSPA program. The first of these alternatives obtains input from a MERGE file which contains hourly weather information (up to 12 sequential years) directly extracted from NOAA TDF-14 and DECK-280 tapes. The second method uses a STAT file which consists of one year of hourly weather data formed by averaging the "n" years of MERGE data. To produce these alternate weather data files, two support program sets were written: MERGE (consisting of the TDF14, DECK280, and LISTMERGE programs) and STAT (consisting of the STATS and PROFILE programs). The usage of these programs is described below.

4.1 MERGE Program Set

The MERGE program set is comprised of three stand-alone programs: TDF14 for extracting date, temperature, and wind velocity data from the NOAA TDF-14 tapes and building a skeletal MERGE file; DECK280 for extracting solar radiation information from the NOAA DECK-280 tapes and inserting it into the MERGE file; and LISTMERGE for randomly viewing and listing the contents of the MERGE file. The procedures for generating a MERGE file for a single station location are as follows:

1. Production of a skeletal MERGE file from a TDF-14 tape

```
@CAT,P 12,F/172/T/210
@ASG,A 12.
@ASG,T 11,T,xxxxR        where xxxx = TDF-14 tape reel number
@REWIND 11
@XQT USER.TDF14
SSSSS FY LY              where SSSSS = TDF-14 tape station
                                       number
                               FY* = first year for MERGE file
                               LY* = last year for MERGE file
@EØF
@FREE 11.
@FREE 12.
```

*FY and LY need not be the same as the limit years on the TDF-14 tape (years are added or skipped as necessary by the program).

2. Addition of DECK-280 tape data to MERGE file

```
@ASG,A 12.
@ASG,T 11,T,zzzzR        where zzzz = DECK-280 tape reel number
@REWIND 11
@XQT USER.DECK280
SSSSS AAAAA BBBBB        where SSSSS = MERGE file station number
                               AAAAA = first alternate DECK-280
                                       tape station, if required
                               BBBBB = second alternate DECK-280
                                       tape station number, if
                                       required
@EØF
@FREE 11.
@FREE 12.
```

The procedures for displaying the contents of the MERGE file, either before of after addition of the DECK-280 data, or of the STAT file described in Section 4.2 below, are as follows:

```
@ASG,A 12.
@XQT USER.LISTMERGE
YYDDD,N                  where YYDDD = Julian date at which to
                                       start viewing
                               N = number of days to be
                                       displayed
YYDDD,N                  [any number of display requests may be
   .                      entered, in any date sequence, as long
   .                      as no print attempt exceeds the file
   .                      limits...0,0 displays the entire
YYDDD,N                   file]
@EØF
@FREE 12.
```

A sample listing of the contents of a MERGE file are shown in Figure 4-1 below.

NOTE: The MERGE file station number and limit dates are displayed before any print request is made.

```
ENTER START DATE (YYDDD) AND NO. OF RECORDS TO DISPLAY

DATE = 55001   SECTOR =     0
      TEMP =    49.00    50.00    50.00    50.00    50.00    51.00    51.00    51.00    50.00    54.00    54.00    56.00
               55.00    55.00    50.00    54.00    54.00    53.00    54.00    54.00    50.00    54.00    60.00    60.00
      WIND =    3.00     4.00      .00     6.00     4.00     4.00     4.00     4.00     2.00     3.00     3.00      .00
                .00     3.00     3.00     4.00     3.00     4.00     2.00     3.00     3.00     2.00     6.00     4.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
             -1000.00 -1000.00 -1000.00    19.76 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 55002   SECTOR =     3
      TEMP =    60.00    61.00    60.00    61.00    62.00    57.00    58.00    59.00    50.00    55.00    55.00    56.00
               56.00    58.00    50.00    59.00    57.00    55.00    56.00    56.00    50.00    55.00    53.00    53.00
      WIND =    6.00     7.00     1.00    10.00    12.00    16.00    16.00    11.00    19.00     7.00     5.00     8.00
                .00    12.00    18.00    13.00     9.00     4.00     9.00     8.00     5.00     8.00     9.00    10.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00     9.30    18.60    34.87   469.54   478.84   612.49
              540.43   412.59   203.39    40.68 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 55003   SECTOR =     6
      TEMP =    52.00    50.00    50.00    48.00    48.00    48.00    48.00    47.00    40.00    51.00    52.00    52.00
               54.00    54.00    50.00    55.00    51.00    47.00    49.00    49.00    40.00    48.00    47.00    46.00
      WIND =    9.00     8.00      .00     6.00     9.00     9.00    10.00     8.00     9.00     8.00    10.00    10.00
               10.00    11.00    14.00    11.00    10.00     6.00     8.00     7.00     9.00     4.00     3.00     4.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    44.16   202.23   417.24   555.54   648.52   653.17
              579.95   438.16   249.88    54.62 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 55004   SECTOR =     9
      TEMP =    47.00    48.00    50.00    53.00    52.00    52.00    52.00    52.00    50.00    53.00    52.00    54.00
               54.00    54.00    50.00    56.00    57.00    54.00    53.00    50.00    50.00    51.00    50.00    49.00
      WIND =    3.00     7.00      .00    10.00    12.00    10.00    10.00    10.00    13.00    13.00    15.00    11.00
                9.00     6.00     7.00     4.00     3.00     4.00     3.00     3.00      .00     7.00     6.00     4.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    18.60    56.95   160.39   457.70   613.65   326.58
              503.24   244.07   196.42    55.79 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 55005   SECTOR =    12
      TEMP =    49.00    50.00    40.00    49.00    49.00    48.00    47.00    47.00    40.00    48.00    48.00    50.00
               50.00    50.00    50.00    48.00    48.00    47.00    47.00    47.00    40.00    47.00    48.00    47.00
      WIND =    8.00     8.00     9.00    10.00    12.00    14.00    13.00    15.00    17.00    15.00    11.00    14.00
               12.00    11.00      .00     8.00     8.00     8.00     6.00    10.00     7.00     5.00     5.00     5.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    25.57   225.47   277.77   469.54   607.84   609.00
              382.37   270.80   163.87    34.87 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 55006   SECTOR =    15
      TEMP =    48.00    49.00    50.00    50.00    50.00    49.00    60.00    59.00    60.00    60.00    62.00    63.00
               64.00    64.00    60.00    60.00    60.00    59.00    60.00    60.00    50.00    50.00    49.00    47.00
      WIND =    4.00     6.00      .00     4.00     4.00    12.00    13.00    13.00    10.00    13.00    16.00    15.00
               15.00    15.00    11.00    16.00    17.00    15.00    16.00    11.00    19.00    20.00    21.00    21.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    36.03   196.42   389.34   533.46   603.19   596.22
              511.38   299.85   127.84    44.16 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
```

FIGURE 4-1. SAMPLE MERGE OUTPUT (Sheet 1 of 3)

```
ENTER START DATE (YYDDD) AND NO. OF RECORDS TO DISPLAY

DATE = 59363   SECTOR =  5478
     TEMP =    64.00    62.00    60.00    57.00    56.00    54.00    54.00    53.00    50.00    54.00    53.00    54.00
               55.00    54.00    50.00    54.00    53.00    51.00    50.00    49.00    40.00    49.00    49.00    49.00
     WIND =    18.00    20.00    18.00    15.00    14.00    13.00    15.00    14.00    14.00    15.00    17.00    15.00
               18.00    20.00    13.00    19.00    17.00    17.00    17.00    16.00    19.00    14.00    13.00    13.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    53.46   191.77   316.12   557.87   609.00
             448.62   348.67   437.00   206.88    47.65 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 59364   SECTOR =  5481
     TEMP =    48.00    48.00    40.00    47.00    46.00    46.00    45.00    44.00    40.00    47.00    48.00    49.00
               49.00    50.00    40.00    48.00    48.00    45.00    44.00    44.00    40.00    44.00    45.00    45.00
     WIND =    11.00    11.00    18.00    11.00    13.00    14.00     8.00     8.00     4.00     7.00     9.00    10.00
               10.00     8.00    19.00    11.00    10.00     6.00     4.00     4.00     4.00     5.00     5.00     7.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    51.14   226.63   416.08   562.52   639.22
             609.00   389.34   212.69   139.47    31.38 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 59365   SECTOR =  5484
     TEMP =    46.00    44.00    40.00    45.00    47.00    46.00    43.00    42.00    40.00    45.00    47.00    46.00
               46.00    45.00    40.00    44.00    43.00    42.00    41.00    42.00    40.00    42.00    41.00    41.00
     WIND =     6.00     6.00     4.00     6.00     8.00     8.00     6.00     7.00     3.00    12.00    13.00    14.00
               15.00    16.00    16.00    14.00    13.00    10.00    10.00     8.00     2.00     9.00     7.00     7.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    51.14   176.66   355.64   310.31   345.18
             301.02   409.10   307.99   224.31    41.84 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 60001   SECTOR =  5490
     TEMP =    41.00    40.00    40.00    40.00    40.00    40.00    39.00    39.00    40.00    42.00    42.00    43.00
               45.00    44.00    40.00    43.00    43.00    42.00    42.00    43.00    40.00    45.00    45.00    45.00
     WIND =     7.00    10.00    11.00     8.00    10.00     8.00    11.00     5.00      .00     8.00     9.00    10.00
               11.00     9.00    14.00    11.00    10.00     9.00    10.00     8.00    14.00    12.00    11.00     9.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    32.54   177.82   271.96   325.42   495.11
             524.16   380.05   224.31   112.74    27.89 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 60002   SECTOR =  5493
     TEMP =    46.00    46.00    40.00    47.00    48.00    49.00    49.00    48.00    40.00    51.00    53.00    56.00
               58.00    61.00    60.00    62.00    60.00    59.00    59.00    60.00    60.00    61.00    61.00    62.00
     WIND =     8.00     8.00     7.00    10.00    10.00     9.00     8.00     9.00     9.00    10.00    10.00    10.00
               9.00     6.00     3.00     7.00     8.00     8.00     6.00    10.00    11.00    12.00    16.00    15.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    47.65   211.52   393.99   563.68   628.74
             576.46   391.67   242.90   130.17    30.22 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 60003   SECTOR =  5496
     TEMP =    63.00    62.00    60.00    64.00    65.00    65.00    63.00    63.00    60.00    64.00    65.00    67.00
               65.00    64.00    60.00    58.00    57.00    56.00    54.00    54.00    50.00    52.00    51.00    50.00
     WIND =    17.00    17.00    13.00    19.00    20.00    24.00    24.00    26.00    24.00    27.00    24.00    24.00
               28.00    27.00    10.00    10.00     6.00     7.00     6.00     8.00    13.00    10.00     8.00     8.00
     QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00     4.65    17.43    37.19   104.60   103.44
             106.92    65.08    80.19    97.63    60.44 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
```

FIGURE 4-1. SAMPLE MERGE OUTPUT (Sheet 2 of 3)

```
ENTER START DATE (YYDDD) AND NO. OF RECORDS TO DISPLAY

DATE = 64363   SECTOR = 10968
      TEMP =    46.00    46.00    40.00    46.00    46.00    46.00    46.00    46.00    40.00    47.00    48.00    49.00
                48.00    49.00    40.00    48.00    48.00    46.00    45.00    44.00    30.00    38.00    36.00    35.00
      WIND =    11.00    10.00    16.00    12.00     9.00     8.00     8.00    11.00     6.00     9.00     9.00     9.00
                 8.00     7.00     9.00     7.00     9.00     7.00     7.00     6.00     9.00     6.00     5.00     4.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00     9.30    89.49   180.14   244.07   213.85
              244.07   244.07   267.31   196.42    47.65 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 64364   SECTOR = 10971
      TEMP =    36.00    46.00    40.00    47.00    46.00    41.00    38.00    37.00    40.00    52.00    56.00    58.00
                60.00    59.00    60.00    61.00    60.00    57.00    57.00    56.00    50.00    57.00    57.00    57.00
      WIND =     6.00     5.00     7.00     3.00     3.00     3.00      .00     3.00     1.00     6.00     9.00     8.00
                10.00    11.00    11.00    11.00    10.00    11.00    11.00    12.00    18.00    10.00    12.00    11.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    46.49   211.52   364.94   480.00   536.95
              536.95   474.19   356.80   205.71    41.84 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DATE = 64365   SECTOR = 10974
      TEMP =    56.00    55.00    50.00    54.00    53.00    52.00    52.00    52.00    50.00    55.00    55.00    54.00
                52.00    51.00    50.00    51.00    51.00    49.00    48.00    47.00    40.00    48.00    48.00    48.00
      WIND =    11.00    10.00    15.00    12.00    13.00    12.00    13.00    12.00    13.00    14.00    11.00    15.00
                15.00    15.00    11.00     9.00    10.00     8.00     8.00     7.00     7.00     6.00     6.00     6.00
      QST =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    37.19   195.25   370.77   471.86   549.73
              536.95   473.02   370.75   216.17    51.14 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
```

FIGURE 4-1. SAMPLE MERGE OUTPUT (Sheet 3 of 3)

4.2 STAT Program Set

The STAT program set consists of two stand-alone programs: STATS for generating a basic statistical file from the MERGE data by averaging for each hour of each day over the one to twelve years of MERGE data; PROFILE for profiling the STATS information to the user's specific needs (low, high, means, worst case) and producing a STAT file for use as input to the DSPA. The procedures for generating the intermediate STATS* file are:

```
@ASG,A 12.
@CAT,P 11.
@ASG,A 11.
@ASG,UP LIST.
@BRKPT PRINT$/LIST
@XQT USER.STATS
@BRKPT PRINT$
@FREE 11.
@FREE 12.
@FREE LIST.
@SYM LIST,...
```

where LIST, a listing of the entire STATS file contents generated, may be symmed to any line printer (132-column width)

In addition to the hourly averaging, the STATS program also computes various daily, monthly, and yearly statistics for storage and use by the PROFILE program. A sample set of output for the STATS program is provided in Figures 4-2A, 4-2B, and 4-2C below.

*The STATS file cannot be used as input to the DSPA or LISTMERGE programs since it is formatted differently.

```
STATISTICAL ANALYSIS FOR STATION NUMBER 13745
  LIMIT DATES = 55001 TO 64366
  TIME SPAN = 10 YEARS

DAY =   1   SECTOR =    0
   AVERAGE DAILY WIND VELOCITY =      10.96 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    282.17 WATTS/SQ.M
      TEMP =    45.40    45.10    41.00    45.40    46.80    47.20    47.20    47.40    44.00    48.70    49.90    50.80
              50.90    51.00    47.00    50.10    49.30    47.50    47.20    45.70    40.00    45.20    45.50    46.00
      WIND =    10.80    10.80    10.20    11.00    10.70    10.50    10.80    11.00    10.30     9.70    11.10    11.50
              11.40    11.60    12.70    11.90    11.20    10.90    10.50     9.40    11.80    10.40    11.40    11.50
       QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    47.65   102.13   223.44   344.94   512.04   695.80
              434.01   350.83   238.45    96.96    47.26 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     3.17     7.71    12.58    10.46    10.25     9.38    14.42    10.58    13.00    18.08 -1000.00 -1000.00
DAILY QDT  =  -1000.00   402.13   324.82   217.22   141.88   257.20 -1000.00 -1000.00   365.29   284.84 -1000.00 -1000.00

DAY =   2   SECTOR =    4
   AVERAGE DAILY WIND VELOCITY =      11.03 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    329.43 WATTS/SQ.M
      TEMP =    44.90    44.10    40.00    44.00    43.20    42.80    42.10    41.90    37.00    42.50    43.20    44.10
              44.40    45.80    42.00    46.30    45.30    43.70    43.40    43.70    41.00    44.50    44.20    43.30
      WIND =    12.80    13.00    10.30    12.40    12.30    13.20    13.00    12.40    12.20    11.20    11.40    11.50
              11.80    11.30    11.40    11.10    10.20     8.60     9.20     8.70     6.30     9.20     9.90    10.20
       QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    31.38    87.66   202.46   349.20   438.03   706.70
              484.90   411.04   255.69   122.96    36.73 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     9.71     8.46    18.42    12.71     8.92     9.12     9.17    10.54     8.37    14.42 -1000.00 -1000.00
DAILY QDT  =   282.07   132.96   375.98   300.58 -1000.00   321.70   489.41   410.70   347.50   373.85 -1000.00 -1000.00

DAY =   3   SECTOR =    8
   AVERAGE DAILY WIND VELOCITY =      11.17 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    266.66 WATTS/SQ.M
      TEMP =    43.10    42.80    38.00    42.30    42.00    42.20    41.70    41.40    37.00    44.40    45.90    46.90
              48.30    48.50    43.00    48.10    46.90    44.80    44.50    44.40    40.00    44.20    44.00    43.70
      WIND =    10.30    10.10     9.30    10.30    10.80    11.50    11.90    11.00    12.20    11.90    11.80    12.40
              12.80    13.30    13.00    12.30    11.10    11.00    10.60    11.00     9.10     9.50     9.30    10.30
       QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    30.22    73.48   205.42   343.76   420.00   660.29
              419.75   365.44   250.87   105.60    57.72 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     8.04     5.33    10.87    15.08     9.87    14.75    14.46    10.37     7.42    13.04 -1000.00 -1000.00
DAILY QDT  =   389.35   188.74   342.42   139.93   313.80    67.74 -1000.00   417.70 -1000.00 -1000.00 -1000.00 -1000.00

DAY =   4   SECTOR =   12
   AVERAGE DAILY WIND VELOCITY =      11.28 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    296.68 WATTS/SQ.M
      TEMP =    43.90    44.10    39.00    43.70    43.50    42.60    42.50    42.00    38.00    44.80    46.20    47.10
              48.10    48.60    46.00    48.60    47.60    45.80    45.00    44.10    39.00    43.90    43.10    42.90
      WIND =    11.00    11.50     8.60    11.00    11.10    10.10     9.50     9.60     9.60    10.80    12.20    12.60
              12.90    12.20    12.10    13.00    11.80    11.50    11.30    11.00    10.80    11.60    12.10    11.60
       QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    27.40    83.39   235.35   386.87   474.62   666.31
              500.66   357.71   247.31   125.52    47.65 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     7.04    16.62    12.12    17.50     9.17     6.75    12.17    10.37     9.08    11.46 -1000.00 -1000.00
DAILY QDT  =   260.34    30.68   308.45   283.12   275.21   329.37   405.85   421.19 -1000.00   360.99 -1000.00 -1000.00

DAY =   5   SECTOR =   16
   AVERAGE DAILY WIND VELOCITY =      10.44 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    329.83 WATTS/SQ.M
      TEMP =    42.20    41.40    37.00    40.30    39.80    39.20    39.10    38.00    34.00    41.40    43.00    44.10
              44.90    45.40    41.00    44.70    44.50    42.40    41.10    40.30    35.00    40.30    40.10    40.40
      WIND =    11.70    11.70     9.70    11.50    11.00    12.70    11.90    11.90    11.80    10.80    10.30    11.40
              11.40    11.90    10.40    10.40     9.20     7.90     8.30     8.60     8.80     8.70     8.50     8.90
       QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    20.63    83.16   210.48   342.25   528.00   675.18
              533.11   445.01   295.32   140.75    54.04 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     9.62    18.92    13.50    13.62    17.67     5.83     5.29     4.25     7.83     7.37 -1000.00 -1000.00
```

FIGURE 4-2A. SAMPLE STATS OUTPUT - DAILY DATA (Sheet 1 of 2)

```
DAILY QDT =     306.71   358.66    68.45   369.35   416.89   341.34   389.81   381.33   352.80   285.56 -1000.00 -1000.00

DAY =   6   SECTOR =   20
   AVERAGE DAILY WIND VELOCITY =       9.41 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    280.08 WATTS/SQ.M
      TEMP =     39.80    41.20    37.00    41.10    40.10    40.00    40.90    41.80    39.00    45.20    47.20    47.80
                 48.70    49.10    46.00    49.70    49.60    47.90    46.60    46.10    43.00    46.50    45.30    44.70
      WIND =      8.90     8.70     8.20     9.70     9.20    10.10     9.40     9.40     9.20     9.30     9.10     9.60
                 10.20     9.90    10.40     9.50     9.60     8.80     8.60     8.70     9.20     9.90    10.90     8.40
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    39.81   107.85   254.99   368.77   471.35   490.07
                436.27   318.19   211.65    97.50    34.63 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     12.79     8.71    10.42     4.08    16.12     6.67     8.37    14.21     3.13     9.21 -1000.00 -1000.00
DAILY QDT =     333.79   349.48   262.08   397.71   416.92    43.23   405.38    85.77   181.89 -1000.00 -1000.00 -1000.00

DAY =   7   SECTOR =   24
   AVERAGE DAILY WIND VELOCITY =      13.11 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    248.41 WATTS/SQ.M
      TEMP =     44.30    45.20    41.00    45.00    44.70    44.40    44.40    43.50    42.00    45.80    46.30    47.40
                 48.30    49.30    44.00    48.30    47.70    46.20    45.80    46.00    40.00    45.50    45.30    46.00
      WIND =      6.50    11.20    10.30    12.50    11.90    11.90    10.90    11.50     9.30    11.00    12.90    13.80
                 13.40    13.60    14.40    15.50    16.40    13.90    14.30    14.40    14.70    15.30    15.30    14.80
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    17.72    59.14   151.48   253.62   404.31   437.77
                427.44   352.80   240.06   113.25    40.68 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =     17.79    16.17     9.58    15.21     8.96     8.83    11.67    19.58    10.42    12.29 -1000.00 -1000.00
DAILY QDT =     379.70   293.34   309.50    24.41   326.70    69.97   343.79   387.37 -1000.00    68.74 -1000.00 -1000.00

DAY =   8   SECTOR =   28
   AVERAGE DAILY WIND VELOCITY =      12.09 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    245.32 WATTS/SQ.M
      TEMP =     44.70    44.10    40.00    43.00    42.40    41.70    41.30    40.80    36.00    42.20    43.90    43.70
                 44.30    44.40    40.00    45.00    44.40    43.30    42.40    43.20    39.00    43.00    42.70    42.60
      WIND =     14.40    14.30    12.50    13.60    13.30    12.90    12.30    12.70    13.00    12.90    12.90    12.10
                 11.80    11.30     9.90    10.50    10.70     9.90     9.90    10.80    10.10    12.50    12.30    12.80
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    36.80    91.38   246.78   368.17   382.02   384.70
                335.75   243.37   201.99   106.23    38.55 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =      9.25    22.54    10.00    14.12    10.87     9.67    12.12    13.37     8.92     9.50 -1000.00 -1000.00
DAILY QDT =     396.43    76.82   414.91   341.93   130.05   402.13   228.83   195.02   216.84    49.14 -1000.00 -1000.00

DAY =   9   SECTOR =   32
   AVERAGE DAILY WIND VELOCITY =      12.17 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    272.99 WATTS/SQ.M
      TEMP =     42.30    41.60    37.00    40.80    40.20    39.80    39.70    39.10    36.00    42.10    43.40    44.20
                 44.80    45.30    40.00    46.30    45.60    44.50    43.40    42.30    38.00    41.90    41.90    43.60
      WIND =     13.10    12.60    11.90    13.00    12.60    12.30    12.10    11.20    10.30    11.40    13.50    13.20
                 13.40    13.80    12.90    11.30    11.00    10.60    12.00    10.90    10.70    11.80    12.60    12.60
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    18.60    71.59   196.65   315.54   395.04   431.30
                426.65   377.84   277.54   134.95    59.51 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =      8.67    19.12    11.58    13.92    16.75     9.33    14.71     7.50     6.04    13.54 -1000.00 -1000.00
DAILY QDT =     119.94    49.63    41.03   384.46   507.46   402.13   429.56   437.34   339.37    41.38 -1000.00 -1000.00

DAY =  10   SECTOR =   36
   AVERAGE DAILY WIND VELOCITY =      13.05 KNOTS,  AVERAGE DAILY SOLAR INSOLATION =    243.41 WATTS/SQ.M
      TEMP =     43.00    42.80    38.00    43.70    43.40    43.40    43.10    43.10    39.00    44.60    46.00    46.50
                 46.30    47.10    42.00    46.40    45.80    43.80    43.40    42.70    39.00    42.20    42.20    41.80
      WIND =     11.90    11.70    14.20    11.20    11.50    12.50    12.60    12.80    13.00    14.20    14.10    15.00
                 14.70    15.00    15.50    12.50    12.80    12.40    13.40    12.10    12.40    12.60    11.70    12.10
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    32.54    90.65   214.87   307.70   363.78   382.95
                409.97   274.57   219.66   130.30    46.04 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00
DAILY WIND =      9.79    14.92    22.21    12.21    13.79    12.29     8.62    14.75     6.71    14.67 -1000.00 -1000.00
DAILY QDT =     240.93    43.12   241.97   405.38 -1000.00   256.27 -1000.00    30.92   345.88   407.55 -1000.00 -1000.00
```

FIGURE 4-2A. SAMPLE STATS OUTPUT - DAILY DATA (Sheet 2 of 2)

MONTH = 1	SECTOR = 1464													
TEMP =	42.89	38.42	44.78	40.81	43.37	46.12	41.75	45.74	41.55	46.48	.00	.00	43.19	2.62
WIND =	11.80	11.90	12.74	11.71	10.11	9.98	10.99	11.00	8.33	10.95	.00	.00	10.95	1.24
GDT =	253.50	220.27	211.27	292.02	261.89	263.32	308.36	232.44	232.70	334.81	.00	.00	263.06	40.43
MONTH = 2	SECTOR = 1468													
TEMP =	44.92	50.07	49.51	38.58	48.12	45.84	47.73	47.23	41.22	44.15	.00	.00	45.74	3.48
WIND =	12.33	11.98	12.51	13.18	9.88	11.61	12.74	9.82	12.03	11.18	.00	.00	11.73	1.14
GDT =	329.23	335.62	256.88	344.35	337.47	357.93	318.11	271.58	265.04	269.40	.00	.00	304.46	38.55
MONTH = 3	SECTOR = 1472													
TEMP =	55.25	50.65	49.96	45.15	51.38	41.02	53.87	45.87	54.48	51.79	.00	.00	49.94	4.59
WIND =	13.87	12.56	10.34	11.52	10.72	11.34	12.32	10.78	9.79	9.92	.00	.00	11.32	1.29
GDT =	417.87	390.02	402.74	355.04	394.44	416.49	404.77	320.71	383.35	331.37	.00	.00	381.78	34.51
MONTH = 4	SECTOR = 1476													
TEMP =	61.09	57.41	62.65	55.08	59.63	61.25	56.24	58.70	57.84	58.31	.00	.00	58.82	2.36
WIND =	11.90	13.79	9.84	12.26	10.42	11.30	14.20	10.34	10.19	9.21	.00	.00	11.29	1.67
GDT =	462.05	489.60	478.58	495.30	480.55	494.05	492.52	480.45	406.63	400.98	.00	.00	465.07	35.90
MONTH = 5	SECTOR = 1480													
TEMP =	67.74	65.15	68.38	65.54	69.12	66.98	62.74	67.64	62.65	65.97	.00	.00	66.19	2.22
WIND =	11.35	13.32	10.17	9.64	10.31	9.48	11.04	9.78	10.06	10.06	.00	.00	10.52	1.14
GDT =	509.33	520.63	471.71	490.22	568.04	510.35	484.72	486.39	393.12	442.58	.00	.00	487.71	46.87
MONTH = 6	SECTOR = 1484													
TEMP =	72.36	73.71	75.93	70.97	74.31	74.01	71.77	74.04	71.89	74.14	.00	.00	73.31	1.51
WIND =	10.47	12.97	8.29	10.28	8.49	9.89	12.00	10.20	9.06	8.91	.00	.00	10.05	1.51
GDT =	478.22	435.45	494.84	418.25	545.97	477.32	427.24	419.38	368.77	426.88	.00	.00	449.23	50.07
MONTH = 7	SECTOR = 1488													
TEMP =	79.40	77.83	77.33	79.21	77.60	76.79	77.94	76.81	75.94	76.77	.00	.00	77.56	1.10
WIND =	10.59	12.71	8.78	9.71	8.90	7.78	10.37	9.58	8.80	8.57	.00	.00	9.53	1.43
GDT =	508.67	482.67	497.79	505.96	484.10	462.33	482.97	508.53	463.70	377.68	.00	.00	477.43	38.93
MONTH = 8	SECTOR = 1492													
TEMP =	79.21	76.56	75.60	78.69	78.37	77.86	77.59	77.02	76.55	75.75	.00	.00	77.32	1.23
WIND =	13.24	11.42	9.65	9.32	8.21	8.42	9.56	8.06	8.25	6.99	.00	.00	9.31	1.84
GDT =	474.23	510.42	424.21	475.51	479.62	454.02	452.94	473.38	458.64	371.37	.00	.00	467.43	37.87
MONTH = 9	SECTOR = 1496													
TEMP =	74.57	72.27	75.81	72.54	74.57	73.83	75.07	71.92	69.94	73.01	.00	.00	73.35	1.74
WIND =	11.49	11.95	8.86	10.24	9.20	8.85	10.76	9.02	10.31	9.52	.00	.00	10.09	1.15
GDT =	382.10	412.75	413.30	500.45	411.72	422.55	426.90	386.08	312.13	367.01	.00	.00	400.50	50.66
MONTH = 10	SECTOR = 1500													
TEMP =	66.29	66.20	61.53	63.30	67.87	64.39	62.51	65.47	63.53	61.53	.00	.00	64.26	2.16
WIND =	10.86	12.92	10.42	10.28	10.64	8.05	8.87	9.28	11.36	10.03	.00	.00	10.27	1.36
GDT =	437.80	293.89	341.77	367.00	318.44	350.00	366.14	324.36	329.90	283.72	.00	.00	341.00	43.86
MONTH = 11	SECTOR = 1504													
TEMP =	54.56	58.64	57.75	58.22	56.85	57.29	56.31	53.75	56.03	58.73	.00	.00	56.51	1.58
WIND =	11.75	11.89	9.83	9.29	11.67	8.30	9.38	11.88	10.17	8.48	.00	.00	10.23	1.40
GDT =	320.16	308.17	255.09	274.41	279.01	298.25	292.48	265.03	271.82	258.05	.00	.00	282.24	21.79

FIGURE 4-2B. SAMPLE STATS OUTPUT - MONTHLY DATA (Sheet 1 of 2)

```
MONTH = 12   SECTOR = 1508
      TEMP =   43.09   55.89   51.24   43.94   48.93   41.39   48.90   43.44   41.13   51.19    .00    .00    46.91   5.00
      WIND =   11.79   11.97   11.57   11.09   11.28   10.20    9.11   10.80    9.28    8.18    .00    .00    10.62   1.28
      QDT  =  274.79  297.05  278.87  275.61  268.28  286.43  259.13  216.95  243.02  209.31    .00    .00   260.44  30.16
```

FIGURE 4-2B. SAMPLE STATS OUTPUT - MONTHLY DATA (Sheet 2 of 2)

```
YEARLY STATISTICS:
10 VALID YEARS OF DATA FOUND
      TMIN =   20.00    .00    .00   10.00   19.00   20.00   20.00   20.00   10.00   20.00 1000.00 1000.00
      MEAN TMIN =   13.90   TMIN STANDARD DEVIATION        8.36
      TMAX =   91.00   87.00   90.00   93.00   93.00   89.00   90.00   92.00   87.00   90.00 -1000.00 -1000.00
      MEAN TMAX =   90.20   TMAX STANDARD DEVIATION        2.15
```

FIGURE 4-2C. SAMPLE STATS OUTPUT - YEARLY DATA

The procedures for producing the final, profiled STAT data for input to the DSPA* are as follows:

```
@ASG, A 11.                    where 11 = intermediate STATS file
@CAT,P 12.                     [MERGE file 12 must be deleted prior to
@ASG,A 12.                      using the PROFILE program]
@ASG,UP LIST.
@BRKPT PRINT$/LIST
@XQT USER.PRØFILE
 $INPT
    ALPHAQ = xx,               Confidence level (0 to 1) for Solar
                                 Insolation Data
    ALPHAT = xx,               Confidence level (0 to 1) for
                                 Temperature Data
    ALPHAV = xx,               Confidence level (0 to 1) for Wind
                                 Velocity Data
    ALPHHV = xx,               Confidence level (0 to 1) for High Wind
                                 Worst Case
    ALPHLQ = xx,               Confidence level (0 to 1) for Low
                                 Insolation Worst Case
    ALPHLV = xx,               Confidence level (0 to 1) for Low Wind
                                 Worst Case
    LH = x,x,x,x,x,x,          (See explanation below)
    PHV =    xx,               Scale Factor (>1) for High Wind Worst
                                 Case
    PLQ =    xx,               Scale Factor (0 to 1) for Low Insolation
                                 Worst Case
    PLV =    xx,               Scale Factor (0 to 1) for Low Wind
                                 Worst Case
    PQ  =    xx,               Proportion (0 to 1) for Solar Insolation
                                 Data
    PT  =    xx,               Proportion (0 to 1) for Temperature Data
    PV  =    xx,               Proportion (0 to 1) for Wind Velocity
                                 Data
 $END
   .                           [One set of namelist input is required
   .                             for each month - 12 sets; duplicate
   .                             data need not be entered within
 $END                            $INPT/$END block]
@EØF
@BRKPT PRINT$
@FREE 11.
@FREE 12.
@FREE LIST.
@SYM LIST,...                  where LIST, a listing of the entire
                                 STAT file contents, may be symmed to
                                 any line printer (132-column width)
```

*Use of the STAT file with the Design Synthesis portion of the DSPA requires the additional namelist input of ZALPHA (confidence level) and ZPRCNT (proportion) for yearly temperature modification.

For each type of data a confidence level (between 0 and 1) and a proportion (between 0 and 1) is entered. As described in the DSPA input, variables which are not assigned a value will be set to 0. The variable LH(6) is used as a flag to the program to indicate what statistical tasks are to be performed:

LH(1) = Temperature Flag	-1 = low profile 0 = means profile (for which confidence level and proportion are not used) 1 = high profile
LH(2) = Wind Velocity Flag	[Same as LH(1)]
LH(3) = Solar Insolation Flag	[Same as LH(1)]
LH(4) = Low Insolation Flag	0 = no worst case 1 = perform worst case analysis, center data about the 15th of the month
LH(5) = Low Wind Flag	[Same as LH(4), except data is centered about the 10th of the month]
LH(6) = High Wind Flag	[Same as LH(4), except data is centered about the 20th of the month]

Maximum flexibility has been programmed into the PROFILE program to allow the user to change none, any, or all of his requirements every month of the year. But a $INPT and a $END card must be entered for each of the 12 months.

Appendix C and Appendix D give additional guidelines on the use of the PROFILE program for obtaining worst case analyses for periods of low solar insolation. Use of the tables in these appendices is as follows:

> For a selected location, find the appropriate table in Appendix C. Then, for a selected worst case scale factor (PLQ) and for a selected month, look up the corresponding LAMBDA value in the table. Using this LAMBDA value and a selected confidence level (ALPHLQ), determine from Appendix D the number of sequential worst case days that will be used by the PROFILE program. By proper selection of the PLQ and ALPHLQ for each month, the user can obtain the worst case profile he wants: larger PLQ and or larger ALPHLQ produce longer periods of worst case days.

A sample PROFILE output is included in Figure 4-3.

```
***FOR MONTH 12, DELTA/SCALE FACTORS =
        TEMP:  -10.0691    WIND:  .7545    QDT:  .7668
$INPT
ALPHAQ  =      .90000000E+00
ALPHAT  =      .90000000E+00
ALPHAV  =      .90000000E+00
ALPHMV  =      .95000000E+00
ALPHLQ  =      .95000000E+00
ALPHLV  =      .95000000E+00
LH      =                -1.          -1.          -1.          +1.
                         +1.          +1
PMV     =      .75000000E+00
PLQ     =      .75000000E+00
PLV     =      .75000000E+00
PQ      =      .90000000E+00
PT      =      .90000000E+00
PV      =      .90000000E+00
$END
```

DAY = 335	SECTOR = 1002											
TEMP =	31.43	30.03	24.93	29.63	29.33	28.73	26.13	28.73	26.93	33.23	39.43	36.03
	36.63	37.53	32.93	38.23	37.13	34.33	32.93	32.63	29.93	34.03	33.23	33.43
WIND =	8.37	8.90	8.75	8.00	8.75	7.92	7.85	8.15	6.64	8.22	8.83	9.68
	8.90	8.45	9.20	7.92	7.47	6.87	6.71	7.39	8.07	8.30	8.00	8.37
QDT =	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	32.79	175.89	279.37	388.83	428.54	416.36
	372.99	280.51	164.86	40.70	.30	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00
DAY = 336	SECTOR = 1005											
TEMP =	32.63	31.83	24.93	31.63	30.53	30.33	30.83	31.33	28.93	38.03	40.03	41.23
	42.33	43.23	38.93	43.93	43.43	42.03	40.93	40.43	34.93	39.53	41.63	41.73
WIND =	7.54	7.85	9.58	6.71	6.41	6.49	6.64	7.54	7.02	6.79	7.09	7.54
	7.32	7.09	5.73	6.34	6.19	6.64	6.94	7.47	6.34	6.34	7.29	7.09
QDT =	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	24.24	131.79	217.70	273.94	329.32	336.45
	302.54	214.37	123.17	37.87	.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00
DAY = 337	SECTOR = 1008											
TEMP =	41.63	40.73	34.93	41.83	41.63	41.53	40.73	40.13	37.93	44.53	46.23	47.03
	47.73	48.53	44.93	47.73	46.83	44.83	44.13	44.43	38.93	43.63	42.93	43.23
WIND =	7.47	6.34	6.94	7.24	6.79	6.56	6.49	6.19	5.21	6.79	7.62	8.22
	8.53	8.53	10.19	9.96	9.43	8.98	8.53	8.60	8.60	8.37	8.37	7.77
QDT =	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	24.28	94.33	182.30	242.29	346.27	339.19
	285.16	229.40	131.38	36.43	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00
DAY = 338	SECTOR = 1011											
TEMP =	43.33	43.23	39.93	42.73	42.43	41.23	41.03	40.73	37.93	44.43	45.43	45.93
	45.73	46.63	42.93	47.33	46.03	42.93	41.33	40.73	34.93	38.93	38.93	38.83
WIND =	7.77	7.24	6.19	7.92	7.54	6.87	7.02	6.71	5.61	7.39	7.77	8.07
	8.15	8.90	7.02	8.07	7.70	7.24	7.47	7.39	7.02	7.54	7.62	7.62
QDT =	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	21.28	113.57	208.63	304.98	379.71	360.29
	370.61	238.74	125.83	29.59	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00	-1000.00

FIGURE 4-3. SAMPLE PROFILE PROGRAM OUTPUT (Sheet 1 of 6)

```
      TEMP =    38.13    38.93    33.93    39.83    39.73    39.23    39.23    38.83    34.93    44.03    45.83    47.63
                48.23    48.73    42.93    48.43    48.13    45.63    44.23    43.93    39.93    43.43    42.23    41.53
      WIND =     7.32     7.47     7.70     7.85     8.30     8.00     7.32     7.17     8.37     7.32     7.47     7.39
                 7.47     7.85     8.22     7.17     6.64     6.26     5.73     5.58     4.07     6.04     5.58     6.11
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    28.52   136.70   268.23   358.77   376.36   338.39
              294.97   193.77   105.65    27.13 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 340   SECTOR = 1017
      TEMP =    40.93    40.73    35.93    39.23    38.33    37.33    36.93    36.93    34.93    40.13    41.43    42.33
                42.73    43.23    37.93    43.03    41.93    40.33    39.23    38.83    31.93    37.93    37.93    38.03
      WIND =     6.56     5.66     5.43     6.04     6.56     7.39     6.79     7.09     7.92     8.53     8.76     9.20
                 8.83     8.60    10.56     8.98     8.68     8.60     9.05     7.47     9.96     8.90     9.13     9.36
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    19.72   109.99   219.60   279.98   328.57   341.19
              262.89   217.33   115.85    25.40 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 341   SECTOR = 1020
      TEMP =    37.93    37.83    32.93    37.73    36.93    36.43    36.23    35.93    30.93    39.03    40.33    41.33
                41.33    42.03    37.93    41.83    41.03    38.13    36.93    36.83    33.93    36.53    37.13    37.03
      WIND =     9.66     9.51     8.83     9.73     9.51     8.98     8.68     8.37    10.03     9.36    10.11     9.66
                10.19     9.96    10.56     9.13     8.22     7.39     8.15     8.68     7.32     7.85     8.15     8.30
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    28.39   146.04   274.58   354.78   421.17   401.90
              366.70   265.67   136.90    31.64 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 342   SECTOR = 1023
      TEMP =    36.93    37.03    31.93    36.83    36.43    36.13    36.03    35.33    33.93    40.63    42.03    43.63
                44.13    44.53    37.93    44.73    43.63    42.13    41.43    40.53    34.93    39.63    37.73    36.93
      WIND =     7.85     7.77     7.62     8.53     8.00     7.54     6.87     6.41     6.41     7.54     7.77     7.32
                 7.39     8.07     7.85     7.17     7.02     6.87     7.32     6.41     6.64     6.04     5.21     5.88
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    29.05   128.82   249.91   333.78   370.71   336.75
              272.98   226.35   114.16    25.25 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 343   SECTOR = 1026
      TEMP =    36.73    37.83    33.93    37.13    36.43    35.33    34.93    34.53    31.93    38.93    39.53    41.03
                42.03    42.03    36.93    41.13    39.83    38.83    38.43    38.13    33.93    38.43    37.13    36.43
      WIND =     5.66     6.41     5.05     6.87     6.64     6.41     6.87     6.49     7.70     7.62     9.28     9.36
                 9.51    10.19    11.09    10.41    10.26     9.96    10.19     9.43     8.45     8.90     8.83     9.05
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    32.97   131.89   243.64   279.42   335.27   311.90
              268.73   214.67   123.77    31.68 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 344   SECTOR = 1029
      TEMP =    34.13    35.43    29.93    34.43    34.13    33.63    33.13    33.33    29.93    35.83    37.33    37.43
                37.83    38.13    33.93    38.23    37.13    35.63    35.53    35.23    29.93    34.63    34.53    34.63
      WIND =     8.83     8.68     9.88     9.36     9.13     9.13     8.75     8.83     7.85     8.98     9.81     9.36
                 9.58     8.98     8.53     8.37     8.00     7.39     7.47     7.62     6.79     6.71     6.19     6.11
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    22.50   119.75   229.91   325.27   378.73   378.73
              347.94   259.82   136.94    29.51 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 345   SECTOR = 1032
      TEMP =    34.73    34.43    30.93    33.43    34.33    34.93    36.53    36.83    33.93    40.03    42.13    43.53
                43.63    43.83    38.93    44.13    43.63    42.93    41.53    40.73    35.93    40.63    40.13    39.63
      WIND =     5.81     4.41     3.85     6.49     7.02     6.79     6.64     6.56     4.98     7.32     8.30     8.30
                 8.60     9.05     9.96     9.73     9.66     9.96     9.58     8.90     9.73     8.53     8.68     9.13
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    17.92    80.09   173.97   189.91   206.45   190.83
              187.14   135.79    80.87    14.93 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 346   SECTOR = 1035
      TEMP =    39.93    39.33    33.93    37.43    37.23    37.03    36.53    36.83    31.93    38.23    38.73    39.63
```

FIGURE 4-3. SAMPLE PROFILE PROGRAM OUTPUT (Sheet 2 of 6)

```
                39.83   39.63   33.93   39.13   38.13   36.83   36.93   36.83   31.93   35.83   39.73   39.63
      WIND =    10.86    9.81   10.79   10.49   10.34   10.26   10.19   10.64   11.39   10.71   10.79   11.02
                10.19    9.88   10.39   10.64    9.73    8.83    8.98    8.90   10.11    8.90    9.73    8.98
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   14.89   76.86  162.38  249.62  281.01  298.73
              200.60  138.62   83.96   15.55 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 347   SECTOR = 1038
      TEMP =    34.53   33.93   28.93   33.93   33.63   33.13   33.03   33.03   27.93   34.43   35.93   36.93
                37.43   37.73   30.93   36.83   36.53   35.13   34.93   34.13   29.93   34.63   34.83   34.73
      WIND =    9.36    8.90    8.98    8.37    8.60    8.83    9.28    8.22    9.88    8.15    8.75    9.28
                8.83    8.53   11.17    8.83    8.53    8.00    8.37    8.37    8.53    7.39    7.77    7.62
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   20.94  101.14  240.21  334.03  363.73  420.91
              308.59  247.23  138.51   34.37 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 348   SECTOR = 1041
      TEMP =    34.93   34.83   29.93   34.13   34.13   33.93   34.43   34.13   30.93   36.33   37.33   37.63
                38.23   38.23   32.93   38.03   37.03   35.93   36.23   36.73   32.93   35.43   34.93   34.73
      WIND =    7.39    8.15    9.13    8.90    8.83    8.30    8.22    8.53    6.04    8.90    9.58    8.75
                8.60    9.05   10.41    8.22    7.77    7.32    7.77    7.09    7.17    6.41    6.94    6.87
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   27.88  148.82  227.24  284.50  276.05  292.00
              259.22  191.10   98.72   25.15 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 349   SECTOR = 1044
      TEMP =    34.13   33.53   28.93   32.93   32.33   31.73   31.63   31.33   27.93   34.53   35.93   36.33
                36.93   37.43   32.93   37.43   36.83   34.53   32.63   31.93   27.93   32.73   32.33   32.53
      WIND =    6.64    5.88    7.39    6.64    6.71    7.17    7.02    7.09    6.49    8.00    7.77    7.54
                7.70    7.39    7.32    7.02    6.94    6.64    5.96    5.81    4.07    6.64    7.62    7.24
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   20.23  125.83  230.09  301.29  336.40  327.31
              297.11  222.61  124.40   29.80 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 350   SECTOR = 1047
      TEMP =    32.93   32.33   28.93   32.13   32.13   31.73   31.13   31.03   28.93   33.33   34.73   36.13
                34.93   38.23   33.93   38.03   37.13   35.23   33.73   34.93   30.93   35.63   35.93   35.43
      WIND =    7.62    7.54    7.02    6.64    6.87    6.94    7.09    7.62    6.49    8.15    8.30    8.60
                7.92    7.92    7.09    7.09    6.79    6.41    6.94    7.39    5.73    6.71    6.34    6.04
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   30.60   68.88  169.05  283.74  362.07  403.69
              383.19  311.10  197.12   86.44   23.04 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 351   SECTOR = 1050
      TEMP =    34.93   35.03   29.93   38.93   33.23   32.73   33.93   33.63   27.93   35.43   37.03   39.53
                41.43   42.23   37.93   43.23   41.53   39.73   40.03   39.53   34.93   38.43   38.43   38.33
      WIND =    6.49    6.26    6.04    5.51    5.81    5.88    5.81    6.04    6.49    5.21    5.36    6.11
                5.81    5.66    5.21    6.87    6.64    6.04    6.34    6.26    5.36    6.34    6.11    5.96
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   31.49   58.10  152.38  266.36  329.52  357.94
              355.30  293.38  211.50   87.33   24.06 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 352   SECTOR = 1053
      TEMP =    38.63   38.33   33.93   37.53   38.33   38.03   37.73   37.53   34.93   42.63   42.43   43.03
                43.33   42.83   35.93   41.43   40.93   39.73   38.63   38.33   32.93   38.13   38.13   37.13
      WIND =    5.93    4.98    3.55    5.36    5.73    5.88    5.81    5.58    4.22    6.41    8.07    7.70
                8.00    8.07    8.68    8.37    8.83    8.45    8.90    8.60    9.28    7.39    7.70    7.92
      QDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00   16.93   47.43  123.57  190.11  261.99  256.55
              221.89  234.99  168.16   83.32   25.21 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 353   SECTOR = 1056
      TEMP =    34.03   35.73   30.93   33.53   33.43   33.33   32.93   33.03   29.93   34.33   37.73   39.53
                40.33   41.33   36.93   41.53   40.43   38.03   36.73   36.63   30.93   37.53   38.83   39.13
```

FIGURE 4-3. SAMPLE PROFILE PROGRAM OUTPUT (Sheet 3 of 6)

```
      WIND =      7.47      8.45      5.81      7.92      7.92      7.85      8.37      7.39      6.04      8.00      8.90      8.45
                  8.30      8.00      9.28      8.53      9.36      8.15      8.30      8.45      7.92      8.53      8.45      8.15
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     16.34     51.06    141.83    260.75    347.72    381.85
              337.04    293.88    200.41     99.91     36.83  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 354   SECTOR = 1059
      TEMP =     39.03     39.33     34.93     38.43     38.43     38.33     37.63     37.13     33.93     38.53     38.83     39.63
                 39.83     39.93     35.93     39.23     37.13     35.63     35.73     35.43     30.93     35.93     35.93     36.13
      WIND =      8.68      8.53      9.66      9.05      8.83      8.37      8.07      8.98      7.09      9.13      9.20      9.05
                  9.73      9.43      8.15      8.30      9.13      9.36      9.28      8.98      9.88      9.58      9.13      9.13
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     16.04     49.57    159.51    265.78    340.53    332.62
              330.91    281.04    195.94     92.79     30.83  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 355   SECTOR = 1062
      TEMP =     35.63     34.63     29.93     34.83     34.63     34.73     34.23     33.83     29.93     35.53     36.63     37.63
                 37.83     37.53     32.93     37.33     36.53     35.13     34.53     34.73     29.93     32.63     32.23     31.83
      WIND =      9.20      9.51      9.43      9.43      9.51     10.26      9.13      8.90      9.51      9.58      9.28      9.20
                  9.13      9.05      7.39      8.37      7.39      6.79      6.71      6.34      4.68      7.17      6.94      6.79
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     19.31     42.68    116.05    178.35    192.10    191.98
              173.90    158.07    118.52     41.37     10.47  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 356   SECTOR = 1065
      TEMP =     31.53     31.43     25.93     29.63     29.23     29.43     30.13     30.13     27.93     32.63     33.73     34.63
                 36.23     35.93     29.93     35.53     34.73     32.73     31.33     30.73     26.93     30.13     30.93     30.93
      WIND =      6.11      7.17      5.28      6.94      6.71      6.41      6.94      6.79      3.85      6.79      7.09      7.29
                  8.00      8.00      8.83      7.47      6.87      5.28      5.73      5.73      3.24      4.90      5.93      6.13
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     24.65     77.02    184.85    286.15    349.72    382.20
              328.94    279.26    205.14    101.41     27.12  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 357   SECTOR = 1068
      TEMP =     31.73     32.43     30.93     33.03     33.13     32.43     33.13     32.63     29.93     38.33     40.03     43.03
                 44.33     45.13     41.93     44.33     44.53     42.83     42.83     42.03     37.93     40.23     39.43     39.83
      WIND =      5.91      5.81      2.41      5.21      5.81      5.28      5.43      5.43      5.58      6.56      6.49      6.83
                  9.13      9.28      8.68      8.07      8.07      7.32      8.22      7.92      5.73      6.79      6.11      7.02
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     28.07     52.08    156.94    274.77    327.94    341.08
              317.94    235.48    175.75     88.72     26.10  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 358   SECTOR = 1071
      TEMP =     40.13     41.03     35.93     39.73     38.63     37.63     38.43     38.43     33.93     40.03     41.33     41.93
                 42.53     43.03     38.93     41.53     40.53     39.13     38.03     38.13     34.93     38.93     38.43     38.43
      WIND =      7.92      7.85      6.04      6.87      6.26      6.79      7.02      6.34      6.87      6.87      8.00      8.45
                  8.53      8.45      7.92      8.15      8.60      8.45      7.92      7.70      8.07      8.30      9.66      9.43
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     12.18     34.75    104.07    184.17    209.75    289.72
              304.97    307.74    209.31    112.06     32.53  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 359   SECTOR = 1074
      TEMP =     37.93     37.33     31.93     36.93     37.03     36.53     36.33     35.73     29.93     38.73     39.93     40.33
                 41.43     41.73     38.93     42.63     41.33     38.03     36.93     35.83     31.93     38.23     38.43     38.43
      WIND =      9.28      9.51     10.49      9.96      9.66      9.73      9.66      9.20      9.66      9.73      9.81      9.13
                  9.05      8.83      8.90      7.92      7.17      7.09      7.09      6.79      5.66      6.94      7.17      7.29
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     26.14     77.02    186.14    299.69    368.89    404.02
              360.46    294.97    213.38     97.63     32.08  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY = 360   SECTOR = 1077
      TEMP =     34.93     33.93     28.93     34.23     34.43     33.83     33.93     33.23     29.93     37.23     39.23     41.23
                 42.43     42.83     38.93     43.23     42.03     39.83     38.73     38.93     32.93     33.53     38.03     37.93
      WIND =      7.02      6.41      7.70      7.70      7.29      7.47      7.32      6.41      6.11      8.37      9.13      9.13
```

FIGURE 4-3. SAMPLE PROFILE PROGRAM SUMMARY (Sheet 4 of 6)

```
                9.20      9.51      8.37      8.37      7.92      7.77      7.17      7.77      8.98      6.56      7.85      8.15
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     20.50     48.66    138.93    230.21    310.31    391.80
              331.01    305.07    235.66    118.42     29.23  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY =  361   SECTOR =  1080
      TEMP =    37.73     37.43     32.93     37.73     37.13     36.83     36.43     35.63     31.93     39.33     40.43     41.23
                42.83     43.03     38.93     41.93     41.53     39.93     38.53     38.53     33.93     38.23     37.53     37.33
      WIND =     7.54      7.32      8.00      7.02      7.17      6.94      7.39      7.39      6.54      8.00      8.53      8.15
                 8.53      8.07      6.26      7.62      7.85      7.17      7.09      6.71      6.34      7.39      7.17      7.54
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     36.24     66.64    176.05    266.72    343.18    391.03
              388.54    323.09    167.76     93.30     29.41  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

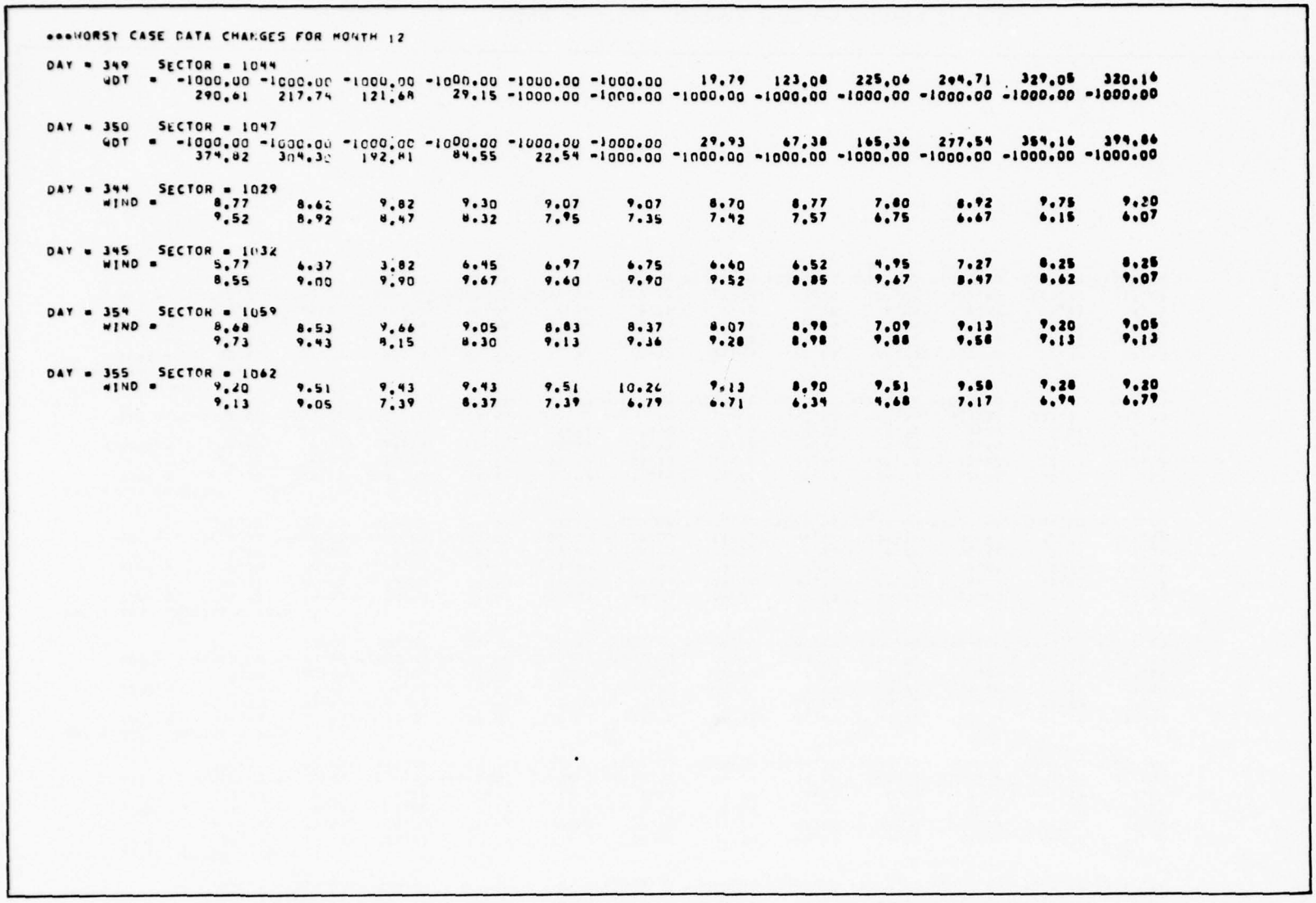
DAY =  362   SECTOR =  1083
      TEMP =    37.63     37.73     32.93     38.03     37.63     37.73     37.53     37.53     32.93     40.93     42.13     43.13
                43.23     43.63     37.93     41.43     40.73     39.83     39.13     39.33     35.93     40.13     39.53     38.93
      WIND =     7.70      7.47      7.47      6.87      6.94      8.30      7.70      7.77      8.83      8.60      9.13      9.43
                 9.88     10.49     10.26     10.41     10.19     10.26     10.56      9.96     10.41     10.03      9.96      9.05
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     33.86     50.44    113.98    196.23    251.92    287.18
              244.71    182.77    130.37     60.33     16.49  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY =  363   SECTOR =  1086
      TEMP =    38.73     38.23     33.93     37.83     37.23     36.73     36.33     35.93     31.93     37.03     36.93     37.53
                37.23     37.73     33.93     38.53     37.63     36.33     35.13     34.93     27.93     33.73     32.93     31.73
      WIND =     8.15      8.07      6.71      8.07      7.54      7.47      8.30      7.92      7.92      8.07      8.37      8.00
                 8.07      8.83      9.66      9.73      8.68      8.45      8.53      8.22      9.81      7.92      8.60      9.20
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     19.61     55.52    131.53    187.83    190.70    199.61
              230.80    221.30    170.01     87.53     22.87  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY =  364   SECTOR =  1089
      TEMP =    31.33     32.13     27.93     32.63     32.53     31.13     30.53     30.13     26.93     32.83     33.73     34.83
                35.33     35.43     30.93     35.13     34.73     33.23     33.13     32.63     26.93     32.13     32.03     32.73
      WIND =     8.30      8.83      8.83      8.75      8.68      8.75      6.30      8.37      8.22      8.90      9.61      9.68
                10.41     11.17     10.79     10.11      9.51      9.13      6.75      7.92      8.90      8.30      8.37      8.98
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     15.15     47.53    154.36    255.26    335.86    382.90
              335.36    266.25    184.47    104.96     29.59  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00

DAY =  365   SECTOR =  1092
      TEMP =    32.63     32.73     28.93     32.53     32.53     32.23     31.53     31.23     26.93     34.93     36.33     36.63
                36.83     37.63     32.93     37.33     36.73     34.93     34.13     35.13     31.93     36.13     36.33     36.33
      WIND =     9.66      9.96      8.98     10.79     10.64     10.64      9.96      9.66      9.88      9.81     10.34      9.73
                10.79     11.02     10.94     10.11      9.43      8.75      8.30      8.95      6.09      8.60      8.53      8.90
      QDT =  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00     24.95     73.74    187.81    301.50    379.43    417.65
              374.08    315.17    211.89    108.72     30.15  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00  -1000.00
```

FIGURE 4-3. SAMPLE PROFILE PROGRAM SUMMARY (Sheet 5 of 6)



```
***WORST CASE DATA CHANGES FOR MONTH 12

DAY = 349   SECTOR = 1044
      WDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    19.79   123.08   225.06   294.71   329.05   320.16
              290.61   217.74   121.68    29.15 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 350   SECTOR = 1047
      WDT =  -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00    29.93    67.38   165.36   277.54   359.16   394.86
              374.82   304.30   192.81    84.55    22.54 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00 -1000.00

DAY = 344   SECTOR = 1029
      WIND =     8.77     8.62     9.82     9.30     9.07     9.07     8.70     8.77     7.80     8.92     9.75     9.20
                 9.52     8.92     8.47     8.32     7.95     7.35     7.42     7.57     6.75     6.67     6.15     6.07

DAY = 345   SECTOR = 1032
      WIND =     5.77     6.37     3.82     6.45     6.97     6.75     6.60     6.52     4.95     7.27     8.25     8.25
                 8.55     9.00     9.90     9.67     9.60     9.90     9.52     8.85     9.67     8.47     8.62     9.07

DAY = 354   SECTOR = 1059
      WIND =     8.68     8.53     9.66     9.05     8.83     8.37     8.07     8.98     7.09     9.13     9.20     9.05
                 9.73     9.43     8.15     8.30     9.13     9.36     9.28     8.98     9.88     9.58     9.13     9.13

DAY = 355   SECTOR = 1062
      WIND =     9.20     9.51     9.43     9.43     9.51    10.24     9.13     8.90     9.51     9.58     9.28     9.20
                 9.13     9.05     7.39     8.37     7.39     6.79     6.71     6.34     4.68     7.17     6.94     6.79
```

FIGURE 4-3. SAMPLE PROFILE PROGRAM SUMMARY (Sheet 6 of 6)

4.3 DSPA Program Modifications

The namelist input and the weather data reader subroutines of the DSPA program required modification to facilitate usage of the STAT files. Additionally, three Block Data variables were moved to the user input list. The following table describes the variables added to the DSPA namelist input:

Name	Dimensions	Units	Default	Type	Description
CLSIT	(6)	Amps	Table III	Real	Table of reference lamp current ratings for CLST
CLST	(6, 7)	-	Table III	Real	Table of cold filament lamp surge coefficient vs. lamp current rating and initial flash duration
CLSTT	(7)	Seconds	Table III	Real	Table of reference lamp flash durations for CLST
ZALPHA	-	-	0.0	Real	Confidence level for Design Synthesis yearly minimum and maximum temperature determination
ZPRCNT	-	-	0.0	Real	Proportion for Design Synthesis yearly minimum and maximum temperature determination

APPENDIX A

GLOSSARY

DSPA	Design Synthesis/Performance Analysis
I-V	Current-Voltage
NAPS	Navigation Aid Power System
NOAA	National Oceanic and Atmospheric Administration

APPENDIX B

SAMPLE DS/PA RUN

```
@XQT DSPA.DSPA
2,0,0.0,12.0,9.0,
 $INPT
      ACELL=4.0,
      BRCEST=0.05,  BRCHHX=0.1,  BRDEST=-0.05,  BRDSTD=0.05,
      CBAVAL=1.0,1.5,2.5,5.0,6.0,8.0,10.0,15.0,20.0,25.0,30.0,35.0,
             40.0,50.0,70.0,100.0,150.0,200.0,600.0,1200.0,10*0.0,
      CBMAX=60.0,  CDEGA=2.0,  CDEGB=2.0,
      CELPAC=0.7,  CLR=0.55,  CN=0.8,
      CURZ=10.0,50.0,8*0.0,0.25,1.0,8*0.0,
      DCDAT=932.0,1864.0,3728.0,10000.0,6*0.0,213.20,161.90,132.90,
            132.90,6*0.0,
      DCDCHT=17.00,17.00,3*0.0,17.00,17.00,39*0.0,
      DCDCNT=1.0,1000.0,8*0.0,
      DCDCPT=1.0,10000.0,8*0.0,
      DCDCT=1.0,10000.0,8*0.0,
      DCDET=20.00,20.00,8*0.0,20.00,20.00,83*0.0,
      DCDNNT=1.0,10000.0,8*0.0,1.0,10000.0,3*0.0,
      DCDNPT=10.0,50.0,8*0.0,10.0,50.0,8*0.0,
      DCDNT=1.0,1000.0,8*0.0,
      DCDNZT=19.036539,50.00,8*0.0,19.036539,50.00,88*0.0,
             19.036539,50.00,8*0.0,19.036539,50.00,98*0.0,
      DCDPNT=1.0,1000.0,9*0.0,
      DCDPPT=1.0,10000.0,9*0.0,
      DCDPST=17.00,17.00,8*0.0,17.00,17.00,88*0.0,
      DDDT=7.6009024,7.6158055,9*0.0,100.0,0.0,8*0.0,
      DTAMB1=0.0,1.0,2.0,3.0,4.0,5.0,6.0,7.0,8.0,
             11.0,12.0,13.0,14.0,15.0,16.0,
             17.0,18.0,19.0,20.0,21.0,22.0,23.0,24.0,
             -3.744,-5.544,-8.064,3*-8.244,-7.344,-10.944,-8.064,
             -2.844,4.356,7.056,10.656,12.456,14.256,12.456,8.856,
             5.256,3.456,1.656,-0.144,-1.044,-1.944,-3.744,-3.744,
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            221.0,229.0,237.0,244.0,274.0,305.0,335.0,365.0,348*0.0,
            -7.3,-6.6,-5.5,-4.0,-1.4,2.2,4.2,4.9,5.6,8.0,
            9.8,10.3,9.8,8.8,5.4,1.6,-4.0,-7.3,348*0.0,
      DTTESG=15.0,  DTTPCO=15.0,  DTTPSG=20.0,  DURAM=6.0,
      DWDAT=1.0,10.0,100.0,1000.0,10000.0,5*0.0,5*2.7,5*0.0,
      DWDCHT=1.0,10.0,100.0,10000.0,100000.0,5*0.0,0.01543234,
             0.09259404,0.03858085,0.01082639,0.01082638,5*0.0,
      DWDET=0.0,100.0,8*0.0,0.077,0.077,8*0.0,
      DWDNZT=1.0,10.0,50.0,7*0.0,0.00308647,0.01653465,0.03306930,7*0.0,
             1.0,10.0,50.0,7*0.0,0.00308647,0.01653465,0.03306930,7*0.0,
      DWDPST=1.0,10.0,100.0,10000.0,5*0.0,0.01543234,0.09259404,
             0.03858035,0.01082638,6*0.0,
      FRCELL=0.5,  HDER=0.2,  HDZMX=50.0,
      ICHRT=0,  IFTYPE=3,  INDFLS=1,  ISH=0,
      NBATP=1000,  NCDEG=3,  NCURZ=2,
      NDCDA=4,  NDCDC=2,  NDCDCN=2,  NDCDCP=2,
      NDCDN=2,  NDCDNN=2,  NDCDNP=2,
      NDCDPN=2,  NDCDPP=2,  NDDD=2,  NDTAMB=25
      NDTTA=18,  NDWDA=5,  NDWDCH=5,
      NDWDE=2,  NDWDNZ=3,  NDWDPS=4,
      NPREQ=1,  NSAP=1000,  NTCZT=3,  NTCZV=10,
      NVCHIS=2,  NVCHIO=2,  NVCHT=2,  NVCHV=2,  NVDEG=2,
      NVLBT=7,  NVLBV=10,  NVRISA=7,  NVRIO=7,
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      NXIHT=7,  NXIHV=10,  NZDT=7,  NZDV=3,
      NZRA=7,  NZRS=7,  NZSA=2,  NZTC=10,
      PHIAAD=0.0,  PHIAID=0.0,
      QBRES=0.5,  QOFF=0.69389320,  QON=0.13863864,
      REFLH=0.3,  RLL=0.05,
      SADEGC=0.0,730.0,2000.0,33*0.0,0.0,10.0,10.0,33*0.0,
      SADEGV=0.0,2000.0,34*0.0,0.0,5.0,34*0.0,
      SARES=0.2,  SPECOR=1.183,  TBDSTO=70.0,
      TCZIV=-2.0,-1.0,0.00,0.02,0.07,0.17,0.33,0.57,1.05,1.40,
            -1.0,0.00,0.02,0.04,0.10,0.21,0.40,0.64,1.00,1.25,
            0.00,0.01,0.03,0.07,0.15,0.26,0.43,0.64,0.95,1.15,70*0.0,
      TCZT=-55.0,25.0,100.0,7*0.0,
      TCZV=0.92,0.93,0.94,0.95,0.96,0.97,0.98,0.99,1.00,1.05,
      THELAD=33.9333,  THELOD=118.3833,
      TLL=0.5,0.2,14*0.0,
      TTAVE=58.9,  TZN=8.0,
      VBUSMN=5.0,  VBUS=12.0,  VDEGA=5.0,
      VCHIST=0.0,200.0,8*0.0,17.0,17.0,8*0.0,
      VCHIOT=0.0,200.0,8*0.0,1.5,1.5,8*0.0,
      VCHIT=17.0,22.0,3*0.0,17.0,22.0,88*0.0,
      VCHTT=0.0,200.0,3*0.0,
      VCHVT=14.2,14.5,3*0.0,
      VLBT=0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
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           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,
           0.0,0.0,9.4,11.6,11.7,11.91,11.98,12.0,12.2,15.65,30*0.0,
      VLBTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
      VLBVT=0.0,0.6,10.2,12.2,12.3,12.7,13.0,13.25,18.0,100.0,
      VLR=12.0,  VMAXIV=20.0,  VMINIV=0.0,  VSAINC=0.25,
      VRISAT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*12.3,3*0.0,
      VRIJT=-40.0,0.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.6,3*0.0,
      XIHIT=2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
            2*0.0,.000759,.0027,.00329,.00365,.0038,.0041,.00421,.00842,
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            30*0.0,
      XIHTT=-40.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,
      XIHVT=0.0,0.6,1.5,3.8,4.5,10.0,12.3,18.0,20.0,100.0,
      ZDIMP=0.069,0.093,0.135,7*0.0,0.091,0.138,0.243,7*0.0,
            0.120,0.170,0.318,7*0.0,0.135,0.187,0.350,7*0.0,
            0.141,0.197,0.357,7*0.0,0.149,0.205,0.390,7*0.0,
            0.155,0.215,0.400,37*0.0,
      ZDIMPT=-100.0,-50.0,0.0,0.0,30.0,50.0,90.0,150.0,3*0.0,
      ZDIMPV=4.983,7.872,19.955,7*0.0,
      ZRAT=-40.0,0.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.00711,3*0.0,
      ZRST=-40.0,0.0,0.0,25.0,50.0,75.0,100.0,150.0,3*0.0,7*0.0711,3*0.0,
      ZSATAB=0.0,100.0,8*0.0,0.7,0.7,8*0.0,
      ZTCOEF=2.0,2.6,3.0,4.0,5.0,5.7,7.0,20.0,100.0,200.0,
         -0.07,-0.08,-0.075,-0.047,-0.005,0.025,0.04,0.077,0.095,0.097,
 $END
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      QB=0.75,  RL=0.02,  RSA=0.05
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      SPGR1=0.0,0.2,0.4,0.6,0.8,1.0,4*0.0,
            1.09,1.13,1.173,1.215,1.259,1.309,4*0.0,
      T9FRZ1=1.30,1.27,1.28,1.27,1.26,1.22,1.16,1.10,1.04,1.01,
             -95.0,-77.0,-92.0,-78.0,-76.0,-30.0,2.0,18.0,28.0,32.0,
      TSHREF=20.0,  TZ3R=20.0,
      VSHTOR=3.97,  VZ3R=2.99,
      XPLT=1.0,1.15,1.3,1.45,1.6,1.8,2.3,2.45,2.6,3.4,
      ZCHRAT=0.0,200.0,8*0.0,0.1,0.1,8*0.0,
      ZCHRST=0.0,200.0,8*0.0,1.0,1.0,8*0.0,
 $END
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1,0.0,4*0.0,0.0,0.0,1.0,
2,0.0,8*0.0,0.0,0.0,0.0,
1,0.0,4*0.0,0.0,0.0,0.0,0.0,
1,0.0,8*0.0,0.0,1.0,1.0,
1,0.0,4*0.0,0.0,0.0,2.0,
2,0.0,8*0.0,0.0,0.0,1.0,
1,0.0,4*0.0,0.0,0.0,0.0,
1,0.0,8*0.0,0.0,1.0,1.0,
1,0.0,4*0.0,0.0,0.0,2.0,
2,0.0,8*0.0,0.0,0.0,3.0,
1,0.0,4*0.0,0.0,0.0,4.0,
1,0.0,4*0.0,0.0,0.0,5.0,
$EOF
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NAVIGATION AID POWER SYSTEM DESIGN CHARACTERISTICS DS-PAGE 01

MISSION DURATION =	.6000+01	YEARS	BUOY LATITUDE =	.3393+02	DEGREES
DESIGN PERIOD =	52	WEEKS	BUOY LONGITUDE =	.1184+03	DEGREES
NOMINAL OPERATING VOLTAGE =	.1200+02	VOLTS	TIME ZONE NUMBER =	.8000+01	
SOLAR ARRAY SURFACE TILT ANGLE =	.0000	DEGREES	AVERAGE YEARLY TEMPERATURE =	.5890+02	DEG. FAHRENHEIT
SOLAR ARRAY SURFACE AZIMUTH ANGLE =	.0000	DEGREES	MAXIMUM AMBIENT TEMPERATURE =	.8346+02	DEG. FAHRENHEIT
			MINIMUM AMBIENT TEMPERATURE =	.4064+02	DEG. FAHRENHEIT

DESIGN PERIOD LOAD ENERGY REQUIREMENTS (WATT-HOURS)

FOR SOLAR OCCULTATION= .3141+04 FOR SHARE-MODE OPERATION= .1748+01 FOR BATTERY-CHARGING PERIODS= .2022+03

USER SYSTEM REQUIREMENTS

FLASHER PATTERN TYPE = 3
FLASHER PATTERN = .4, 3.6,

SOLAR INSOLATION LEVEL FOR LAMP-FLASHER TURN-ON =	.1384+00	WATTS/SQ.METER
SOLAR INSOLATION LEVEL FOR LAMP-FLASHER TURN-OFF =	.6932+00	WATTS/SQ.METER
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-FLASHING CURRENT =	.6122-01	AMPERES
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-OFF CURRENT =	.3780-02	AMPERES
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-FLASHING LOAD =	.7346+00	WATTS
POWER CONDITIONING AND DISTRIBUTION GROUP LAMP-OFF LOAD =	.4537-01	WATTS

INDIVIDUAL POWER SYSTEM CHARATERISTICS

SUBSYSTEM	TYPE	NO. TO BE PROCURED	WEIGHT (POUNDS)	AREA (SQ. FEET)	COST ($)
POWER SOURCE GROUP	0				
SOLAR ARRAY		1000	.1993+01	.7381+00	.1652+03
SHUNT LIMITER	0	0	.0000		.0000
ENERGY STORAGE GROUP					
BATTERY		1000	.1219+03		.3165+05
CHARGER	0	0	.0000		.0000
TOTALS			.1238+03		.3182+05

SUMMARY OF ENGINEERING DESIGN DATA
FOR NAVIGATION AID POWER SYSTEM

MISSION DURATION =	.6000*01	YEARS	POWER SOURCE GROUP ENERGY REQUIREMENT =	.4256*04	WATT-HOURS
DESIGN PERIOD =	52	WEEKS	SOLAR ARRAY ENERGY REQUIREMENT =	.4610*04	WATT-HOURS
MAXIMUM SOLAR RADIATION =	.9652*03	WATTS/SQ.METER	MAXIMUM SOLAR ARRAY POWER =	.5348*01	WATTS
TOTAL DESIGN PERIOD SOLAR RADIATION =	.1772*07	WATT-HOURS/SQ.METER	AVERAGE POWER SOURCE GROUP POWER =	.9544*00	WATTS

POWER SOURCE GROUP

SOLAR ARRAY:

AREA OF A SINGLE SOLAR CELL =	.4000*01	SQ.CENTIMETERS
NO. OF SOLAR CELLS IN PARALLEL =	1	
NO. OF SOLAR CELLS IN SERIES =	30	
NO. OF ELECTRICAL SECTIONS IN PARALLEL =	4	
TOTAL NO. OF SOLAR CELLS =	120	
SOLAR ARRAY RESERVE FRACTION =	.2000*00	
ELECTRICAL SECTION BLOCKING DIODE RATING =	.1028*00	WATTS

SHUNT LIMITER:

TYPE OF SHUNT LIMITER =

ENERGY STORAGE GROUP

BATTERY:

NO. OF STORAGE CELLS IN SERIES =	6	
NO. OF BATTERIES IN PARALLEL =	3	
BATTERY RESERVE FRACTION =	.5000*00	
DISCHARGE CAPACITY FOR A SINGLE BATTERY =	.5000*02	AMP-HOURS
TOTAL DISCHARGE CAPACITY FOR ALL BATTERIES =	.1500*03	AMP-HOURS
MAXIMUM CHARGING CURRENT FOR A SINGLE BATTERY =	.5000*01	AMPERES
TOTAL BATTERY ENERGY =	.1583*04	WATT-HOURS

CHARGER:

TYPE OF CHARGER =		
MAXIMUM LOAD FOR A SINGLE CHARGER =	.0000	WATTS

BATTERY RESERVE FRACTION =	.5000+00	
STANDARD NORMALIZED BATTERY DISCHARGE CURRENT =	.5000-01	AMPERES
STANDARD BATTERY DISCHARGE TEMPERATURE =	.7000+02	DEG. FAHRENHEIT
BATTERY CHARGER TURN-ON INPUT VOLTAGE =	.0000	VOLTS
BATTERY CHARGER SATURATED-TO-ACTIVE INPUT VOLTAGE =	.0000	VOLTS
TOTAL MISSION BATTERY CYCLE REQUIREMENTS =	2185	
THEORETICAL DEPTH-OF-DISCHARGE =	.1000+01	
MAXIMUM ALLOWABLE CHARGING CURRENT FOR A SINGLE BATTERY =	.5000+01	AMPERES
ACTUAL DEPTH-OF-DISCHARGE =	.4842+00	
TOTAL BATTERY ENERGY =	.1583+04	WATT-HOURS
THEORETICAL DISCHARGE ENERGY REQUIREMENT =	.7663+03	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 1 =	.1533+04	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 2 =	.7663+03	WATT-HOURS
DISCHARGE ENERGY USING CRITERION NO. 3 =	.9692+02	WATT-HOURS
SELECTED DISCHARGE ENERGY CAPACITY =	.1533+04	WATT-HOURS

POWER LOAD PROFILE ANALYSIS

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WEEK INDEX	NO. OF MODE REVERSALS	WEEKLY DURATION OF SOLAR OCCULTATION (HOURS)	WEEKLY DURATION OF SHARE-MODE OPERATIONS (HOURS)	WEEKLY DURATION OF CHARGING PERIODS (HOURS)	WEEKLY TOTAL OF SOLAR INSOLATION (WT-HRS/SQ.M)	WEEKLY SOLAR INSOLATION MAXIMUM (WT-HRS/SQ.M)	BATTERY DISCHARGE ENERGY DURING SOLAR OCCULTATION (WATT-HOURS)	BATTERY DISCHARGE ENERGY DURING SHARE-MODE OPERATIONS (WATT-HOURS)	BATTERY DISCHARGE ENERGY DURING CHARGING PERIODS (WATT-HOURS)
1	14	.9875+02	.5367-01	.6918+02	.1784+05	.5075+03	-.7255+02	-.3939-01	.2937+02
2	14	.9908+02	.5725-01	.6885+02	.1711+05	.5164+03	-.7279+02	-.4202-01	.2316+02
3	14	.9903+02	.4861-01	.6891+02	.2007+05	.5310+03	-.7275+02	-.3567-01	.2760+02
4	14	.9860+02	.5019-01	.6934+02	.1996+05	.5512+03	-.7243+02	-.3682-01	.2761+02
5	14	.9778+02	.5219-01	.7016+02	.1991+05	.5761+03	-.7183+02	-.3830-01	.2787+02
6	14	.9660+02	.4355-01	.7135+02	.2410+05	.6048+03	-.7097+02	-.3196-01	.3483+02
7	14	.9510+02	.4460-01	.7285+02	.2450+05	.6360+03	-.6987+02	-.3273-01	.3619+02
8	14	.9333+02	.4494-01	.7462+02	.2472+05	.6680+03	-.6856+02	-.3410-01	.3743+02
9	14	.9134+02	.3916-01	.7662+02	.2982+05	.7388+03	-.6710+02	-.2874-01	.4692+02
10	14	.8919+02	.4077-01	.7877+02	.3280+05	.8276+03	-.6552+02	-.2992-01	.5333+02
11	14	.8693+02	.4334-01	.8102+02	.3370+05	.8580+03	-.6386+02	-.3181-01	.5643+02
12	14	.8463+02	.3735-01	.8332+02	.3479+05	.8227+03	-.6217+02	-.2741-01	.6039+02
13	14	.8234+02	.3975-01	.8561+02	.3855+05	.9059+03	-.6049+02	-.2917-01	.6866+02
14	14	.8011+02	.4314-01	.8784+02	.3951+05	.9233+03	-.5885+02	-.3165-01	.7227+02
15	14	.7797+02	.3785-01	.8998+02	.3909+05	.8714+03	-.5728+02	-.2777-01	.7322+02
16	14	.7598+02	.4089-01	.9197+02	.4384+05	.9463+03	-.5581+02	-.3000-01	.8932+02
17	14	.7415+02	.4488-01	.9380+02	.4385+05	.9533+03	-.5447+02	-.3293-01	.8602+02
18	14	.7250+02	.3971-01	.9544+02	.4199+05	.8915+03	-.5326+02	-.2914-01	.8369+02
19	14	.7106+02	.4312-01	.9688+02	.4662+05	.9613+03	-.5220+02	-.3164-01	.9967+02
20	14	.6983+02	.4747-01	.9810+02	.4620+05	.9633+03	-.5130+02	-.3483-01	.9997+02
21	14	.6882+02	.4202-01	.9912+02	.4385+05	.8975+03	-.5056+02	-.3083-01	.9091+02
22	14	.6804+02	.4557-01	.9990+02	.4836+05	.9651+03	-.4998+02	-.3344-01	.1014+03
23	14	.6748+02	.5002-01	.1005+03	.4760+05	.9652+03	-.4957+02	-.3670-01	.1003+03
24	14	.6715+02	.4407-01	.1008+03	.4439+05	.8980+03	-.4933+02	-.3233-01	.9972+02
25	14	.6707+02	.4749-01	.1009+03	.4915+05	.9646+03	-.4927+02	-.3484-01	.1091+03
26	14	.6722+02	.5168-01	.1007+03	.4801+05	.9639+03	-.4938+02	-.3792-01	.1018+03
27	14	.6762+02	.4507-01	.1003+03	.4495+05	.8961+03	-.4967+02	-.3307-01	.9991+02
28	14	.6824+02	.4799-01	.9970+02	.4875+05	.9620+03	-.5013+02	-.3520-01	.1020+03
29	14	.6908+02	.5155-01	.9886+02	.4718+05	.9606+03	-.5075+02	-.3782-01	.9781+02
30	14	.7010+02	.4936-01	.9785+02	.4379+05	.8919+03	-.5150+02	-.3255-01	.8961+02
31	14	.7126+02	.4666-01	.9668+02	.4699+05	.9556+03	-.5235+02	-.3423-01	.9526+02
32	14	.7253+02	.4961-01	.9541+02	.4500+05	.9513+03	-.5328+02	-.3640-01	.8989+02
33	14	.7385+02	.4237-01	.9410+02	.4133+05	.8794+03	-.5425+02	-.3109-01	.8115+02
34	14	.7517+02	.4438-01	.9275+02	.4386+05	.9366+03	-.5524+02	-.3256-01	.8507+02
35	14	.7653+02	.4716-01	.9142+02	.4152+05	.9253+03	-.5622+02	-.3461-01	.7921+02
36	14	.7782+02	.4041-01	.9013+02	.3781+05	.8477+03	-.5717+02	-.2965-01	.7083+02
37	14	.7907+02	.4259-01	.8887+02	.3902+05	.8937+03	-.5809+02	-.3125-01	.7217+02
38	14	.8028+02	.4565-01	.8766+02	.3570+05	.8734+03	-.5898+02	-.3350-01	.6488+02
39	14	.8145+02	.3954-01	.8649+02	.3336+05	.7914+03	-.5984+02	-.2901-01	.5962+02
40	14	.8260+02	.4217-01	.8533+02	.3351+05	.8254+03	-.6068+02	-.3095-01	.5911+02
41	14	.8374+02	.4580-01	.8418+02	.2950+05	.7989+03	-.6152+02	-.3362-01	.5097+02
42	14	.8491+02	.4021-01	.8301+02	.2880+05	.7177+03	-.6238+02	-.2951-01	.4900+02
43	14	.8611+02	.4348-01	.8179+02	.2616+05	.6550+03	-.6326+02	-.3191-01	.4369+02
44	14	.8737+02	.4787-01	.8051+02	.2317+05	.6304+03	-.6418+02	-.3513-01	.3767+02
45	14	.8869+02	.4254-01	.7919+02	.2471+05	.6068+03	-.6516+02	-.3124-01	.3971+02
46	14	.9008+02	.4657-01	.7780+02	.2207+05	.5842+03	-.6617+02	-.3418-01	.3456+02
47	14	.9151+02	.5176-01	.7637+02	.1960+05	.5632+03	-.6722+02	-.3799-01	.2982+02
48	14	.9296+02	.4633-01	.7494+02	.2106+05	.5444+03	-.6829+02	-.3400-01	.3163+02
49	14	.9439+02	.5079-01	.7352+02	.1903+05	.5285+03	-.6934+02	-.3728-01	.2780+02
50	14	.9574+02	.5626-01	.7217+02	.1722+05	.5161+03	-.7033+02	-.4129-01	.2496+02
51	14	.9694+02	.4984-01	.7098+02	.1898+05	.5079+03	-.7122+02	-.3657-01	.2676+02
52	14	.9794+02	.5369-01	.6999+02	.1773+05	.5045+03	-.7195+02	-.3941-01	.2498+02

YEAR:	DAY:	HOUR	DAYSST	VBUS	XIPSG	XITT	XIPCD	QB
1975.:	1.:	.00	.000	12.425	.000	-.065	.065	.750
1975.:	1.:	4.00	.167	12.403	.000	-.065	.065	.748
1975.:	1.:	8.00	.333	12.175	.018	.015	.004	.747
1975.:	1.:	12.00	.500	12.059	.229	.226	.004	.749
1975.:	1.:	16.00	.667	12.089	.027	.023	.004	.750
1975.:	1.:	20.00	.833	12.253	.000	-.064	.064	.748
1975.:	2.:	4.00	1.167	12.402	.000	-.065	.065	.745
1975.:	2.:	8.00	1.333	12.169	.018	.015	.004	.743
1975.:	2.:	12.00	1.500	12.048	.132	.128	.004	.744
1975.:	2.:	16.00	1.667	12.081	.013	.009	.004	.745
1975.:	2.:	20.00	1.833	12.256	.000	-.064	.064	.743
1975.:	3.:	4.00	2.167	12.395	.000	-.065	.065	.740
1975.:	3.:	8.00	2.333	12.162	.018	.015	.004	.739
1975.:	3.:	12.00	2.500	12.041	.134	.131	.004	.740
1975.:	3.:	16.00	2.667	12.073	.014	.010	.004	.740
1975.:	3.:	20.00	2.833	12.249	.000	-.064	.064	.739
1975.:	3.:	24.00	3.000	12.318	.000	-.064	.064	.737

ARE SUMMARY OUTPUT TABLES DESIRED?

>YES

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS

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TABLE 1: UNREGULATED BUS SUMMARY

DATE OF TEST YEAR:DAY:HOUR	TIME SINCE START (DAYS)	POWER SYSTEM OPERATING VOLTAGE (VOLTS)	POWER SOURCE GROUP POWER (WATTS)	POWER SOURCE GROUP CURRENT (AMPERES)	ENERGY STORAGE GROUP POWER (WATTS)	ENERGY STORAGE GROUP CURRENT (AMPERES)	POWER CONDITIONING AND DISTRIBUTION GROUP POWER (WATTS)	POWER CONDITIONING AND DISTRIBUTION GROUP CURRENT (AMPERES)
1975: 1: .00	.00	12.43	.0000	.0000	.8035+00	-.6467-01	.8035+00	.6467-01
1975: 1: 4.00	.17	12.41	.0000	.0000	.8019+00	-.6463-01	.8019+00	.6463-01
1975: 1: 8.00	.33	12.17	.2241+00	.1841-01	.1779+00	.1461-01	.4616-01	.3791-02
1975: 1:12.00	.50	12.06	.2745+01	.2293+00	.2719+01	.2255+00	.4563-01	.3784-02
1975: 1:16.00	.67	12.09	.3249+00	.2688-01	.2792+00	.2309-01	.4577-01	.3786-02
1975: 1:20.00	.83	12.26	.0000	.0000	.7844+00	-.6396-01	.7844+00	.6396-01
1975: 2: 4.00	1.17	12.40	.0000	.0000	.8014+00	-.6461-01	.8014+00	.6461-01
1975: 2: 8.00	1.33	12.17	.2243+00	.1843-01	.1781+00	.1464-01	.4613-01	.3791-02
1975: 2:12.00	1.50	12.05	.1572+01	.1321+00	.1546+01	.1284+00	.4558-01	.3783-02
1975: 2:16.00	1.67	12.08	.1580+00	.1308-01	.1122+00	.9291-02	.4573-01	.3785-02
1975: 2:20.00	1.83	12.26	.0000	.0000	.7835+00	-.6393-01	.7835+00	.6393-01
1975: 3: 4.00	2.17	12.39	.0000	.0000	.8004+00	-.6458-01	.8004+00	.6458-01
1975: 3: 8.00	2.33	12.16	.2226+00	.1830-01	.1745+00	.1451-01	.4610-01	.3790-02
1975: 3:12.00	2.50	12.09	.1619+01	.1345+00	.1574+01	.1307+00	.4555-01	.3783-02
1975: 3:16.00	2.67	12.07	.1685+00	.1396-01	.1228+00	.1017-01	.4570-01	.3785-02
1975: 3:20.00	2.83	12.25	.0000	.0000	.7826+00	-.6390-01	.7826+00	.6390-01
1975: 3:24.00	3.00	12.32	.0000	.0000	.7911+00	-.6422-01	.7911+00	.6422-01

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS PAGE-PAGE 0001

TABLE 2: POWER SOURCE GROUP SUMMARY

DATE OF TEST YEAR:DAY:HOUR	TIME SINCE START (DAYS)	POWER SOURCE GROUP TEMP. (DEG. F)	INCIDENT SOLAR RADIATION (WATTS/SQ.M)	SOLAR ARRAY VOLTAGE (VOLTS)	SOLAR ARRAY CURRENT (AMPERES)	SOLAR ARRAY POWER (WATTS)	SOLAR ARRAY MAXIMUM POWER (WATTS)	SOLAR ARRAY POWER MARGIN (WATTS)	SHUNT LIMITER VOLTAGE (VOLTS)	SHUNT LIMITER CURRENT (AMPERES)	SHUNT LIMITER POWER (WATTS)
1975: 1: .00	.00	63.59	.0000	.0000	.0000	.0000	.0000	.0000	.1243+02	.0000	.0000
1975: 1: 4.00	.17	69.26	.0000	.0000	.0000	.0000	.0000	.0000	.1241+02	.0000	.0000
1975: 1: 8.00	.33	75.94	.6656+02	.1276+02	.1841-01	.2348+00	.2570+00	.2225-01	.1217+02	.0000	.0000
1975: 1:12.00	.50	82.26	.5735+03	.1266+02	.2293+00	.2904+01	.2909+01	.5356-02	.1206+02	.0000	.0000
1975: 1:16.00	.67	80.46	.8935+02	.1267+02	.2688-01	.3406+00	.3686+00	.2802-01	.1209+02	.0000	.0000
1975: 1:20.00	.83	71.46	.0000	.0000	.0000	.0000	.0000	.0000	.1226+02	.0000	.0000
1975: 2: 4.00	1.17	64.29	.0000	.0000	.0000	.0000	.0000	.0000	.1240+02	.0000	.0000
1975: 2: 8.00	1.33	75.98	.6656+02	.1275+02	.1843-01	.2353+00	.2570+00	.2199-01	.1217+02	.0000	.0000
1975: 2:12.00	1.50	82.28	.3447+03	.1264+02	.1321+00	.1671+01	.1671+01	.8985-03	.1205+02	.0000	.0000
1975: 2:16.00	1.67	80.48	.5519+02	.1266+02	.1308-01	.1656+00	.2008+00	.3523-01	.1208+02	.0000	.0000
1975: 2:20.00	1.83	71.49	.0000	.0000	.0000	.0000	.0000	.0000	.1226+02	.0000	.0000
1975: 3: 4.00	2.17	64.30	.0000	.0000	.0000	.0000	.0000	.0000	.1239+02	.0000	.0000
1975: 3: 8.00	2.33	76.00	.6618+02	.1274+02	.1830-01	.2332+00	.2551+00	.2182-01	.1216+02	.0000	.0000
1975: 3:12.00	2.50	82.30	.3502+03	.1264+02	.1345+00	.1697+01	.1700+01	.5715-03	.1204+02	.0000	.0000
1975: 3:16.00	2.67	80.50	.5723+02	.1266+02	.1396-01	.1766+00	.2100+00	.3335-01	.1207+02	.0000	.0000
1975: 3:20.00	2.83	71.50	.0000	.0000	.0000	.0000	.0000	.0000	.1225+02	.0000	.0000
1975: 3:24.00	3.00	67.93	.0000	.0000	.0000	.0000	.0000	.0000	.1232+02	.0000	.0000

NAVIGATION AID POWER SYSTEM PERFORMANCE ANALYSIS PA03-PAGE 0001

TABLE 03: ENERGY STORAGE UNIT SUMMARY, 3 BATTERIES

DATE OF TEST YEAR:DAY:HOUR	TIME SINCE START (DAYS)	ENERGY STORAGE GROUP TEMP. (DEG. F)	ENERGY STORAGE UNIT POWER (WATTS)	ENERGY STORAGE UNIT VOLTAGE (VOLTS)	BATTERY POWER (WATTS)	BATTERY CURRENT (AMPERES)	BATTERY VOLTAGE (VOLTS)	BATTERY STATE OF CHARGE	BATTERY CAPACITY (AMP-HOURS)	BATTERY SPECIFIC GRAVITY	BATTERY FREEZING TEMP. (DEG. F)
1975: 1: .00	.00	58.54	.2682+00	.1243+02	.2682+00	-.2159-01	.1243+02	.7500+00	.3750+02	.1247+01	-.6134+02
1975: 1: 4.00	.17	59.26	.2677+00	.1241+02	.2677+00	-.2157-01	.1241+02	.7483+00	.3741+02	.1247+01	-.6091+02
1975: 1: 8.00	.33	70.96	.5891-01	.1217+02	.5894-01	.4841-02	.1217+02	.7470+00	.3735+02	.1247+01	-.6059+02
1975: 1:12.00	.50	77.24	.9044+00	.1206+02	.9063+00	.7517-01	.1206+02	.7487+00	.3743+02	.1247+01	-.6101+02
1975: 1:16.00	.67	75.46	.9272-01	.1209+02	.9272-01	.7670-02	.1209+02	.7496+00	.3748+02	.1247+01	-.6123+02
1975: 1:20.00	.83	66.46	.2619+00	.1226+02	.2619+00	-.2135-01	.1226+02	.7481+00	.3740+02	.1247+01	-.6086+02
1975: 2: 4.00	1.17	59.28	.2675+00	.1240+02	.2675+00	-.2157-01	.1240+02	.7446+00	.3723+02	.1246+01	-.6001+02
1975: 2: 8.00	1.33	70.99	.5936-01	.1217+02	.5935-01	.4877-02	.1217+02	.7434+00	.3717+02	.1246+01	-.5969+02
1975: 2:12.00	1.50	77.28	.5154+00	.1205+02	.5153+00	.4277-01	.1205+02	.7443+00	.3721+02	.1246+01	-.5993+02
1975: 2:16.00	1.67	75.43	.3703-01	.1208+02	.3703-01	.3065-02	.1208+02	.7448+00	.3724+02	.1246+01	-.6005+02
1975: 2:20.00	1.83	66.48	.2615+00	.1226+02	.2615+00	-.2134-01	.1226+02	.7433+00	.3716+02	.1246+01	-.5968+02
1975: 3: 4.00	2.17	59.30	.2672+00	.1239+02	.2672+00	-.2156-01	.1240+02	.7399+00	.3699+02	.1245+01	-.5883+02
1975: 3: 8.00	2.33	71.00	.5882-01	.1216+02	.5882-01	.4836-02	.1216+02	.7386+00	.3693+02	.1245+01	-.5851+02
1975: 3:12.00	2.50	77.30	.5295+00	.1204+02	.5295+00	.4356-01	.1204+02	.7395+00	.3698+02	.1245+01	-.5875+02
1975: 3:16.00	2.67	75.50	.4054-01	.1207+02	.4054-01	.3358-02	.1207+02	.7400+00	.3700+02	.1245+01	-.5887+02
1975: 3:20.00	2.83	66.50	.2613+00	.1225+02	.2613+00	-.2133-01	.1225+02	.7385+00	.3693+02	.1245+01	-.5850+02
1975: 3:24.00	3.00	62.90	.2691+00	.1232+02	.2691+00	-.2194-01	.1232+02	.7368+00	.3684+02	.1244+01	-.5808+02

STOP DS/PA

APPENDIX C

LAMBDA VALUES FOR WORST CASE ANALYSIS

TABLE OF LAMBDA VALUES FOR STATION 12839

PLO	J	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.30	1	.125000	.000000	.166667	.000000	.000000	.500000	.000000	.000000	.166667	.250000	.000000	.200000
.40	1	.214286	.142857	.200000	.500000	.200000	.428571	.000000	.000000	.625000	.125000	.333333	.222222
.50	1	.300000	.166667	.157895	.400000	.150000	.500000	.181818	.333333	.818182	.111111	.214286	.214286
.60	1	.280000	.315789	.260870	.181818	.375000	.578947	.500000	.411765	.434783	.160000	.363636	.217391
.70	1	.425000	.266667	.500000	.304348	.531250	.689655	.423077	.708333	.628571	.222222	.533333	.424242
.80	1	.652174	.384615	.487805	.454545	.971429	.921053	.657895	.500000	.833333	.477273	.642857	.750000
.90	1	.867925	.829787	.735849	.541667	1.279070	1.390244	1.000000	.877193	1.117647	.566667	.732143	1.086957
1.00	1	1.186441	1.103448	1.295908	1.177419	1.775510	1.687500	1.527273	1.500000	1.456140	.821918	1.181818	1.283333

TABLE OF LAMBDA VALUES FOR STATION 12919

PLO	J	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.250000	1.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.222222
.30	1	.600000	.454545	.625000	.166667	.666667	.000000	1.000000	.000000	.666667	.000000	.200000	.909091
.40	1	.636364	.600000	.636348	.357143	1.000000	.250000	.500000	.250000	.285714	.300000	.263158	.619048
.50	1	.960000	.650000	.555556	.421053	.666667	.428571	.285714	.272727	.875000	.230769	.684211	.833333
.60	1	.900000	.629630	.500000	.400000	.416667	.777778	.444444	.375000	.700000	.333333	.708333	.793103
.70	1	.916667	.727273	.529412	.807692	.450000	.571429	.454545	.650000	.625000	.541667	.800000	1.000000
.80	1	1.166667	.970588	.800000	1.178571	.689655	.500000	.555556	.916667	.520000	.689355	1.156250	1.142857
.90	1	1.486486	1.212121	1.000000	1.281250	1.064516	.785714	.733333	1.206897	.806452	.939394	1.558824	1.315789
1.00	1	1.805556	1.542857	1.657895	1.384615	1.875000	2.100000	1.852941	2.000000	1.166667	1.275000	2.088235	1.292683

TABLE OF LAMBDA VALUES FOR STATION 13745

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	1.000000	.000000
.20	1	.105263	.000000	.000000	.000000	.000000	.000000	.000000	.166667	.000000	.000000	.090909	.000000
.30	1	.300000	.000000	.055556	.000000	.000000	.117647	.000000	.100000	.066667	.157895	.235294	.076923
.40	1	.307692	.000000	.074074	.050000	.071429	.260870	.200000	.117647	.285714	.259259	.318182	.187500
.50	1	.386364	.217391	.285714	.161290	.173913	.625000	.142857	.190476	.500000	.277778	.266667	.256410
.60	1	.400000	.392157	.348837	.289474	.343750	.642857	.142857	.333333	.500000	.513514	.432432	.365854
.70	1	.549020	.537037	.511111	.311111	.394737	.617647	.205882	.588235	.540541	.547619	.511111	.489362
.80	1	.566038	.616667	.591837	.388889	.448980	.707317	.571429	.780488	.651163	.837209	.660000	.563636
.90	1	.553846	.600000	.583333	.545455	.607143	.829787	.777778	1.000000	.750000	1.065217	.785714	.602540
1.00	1	.805970	.738462	.796875	.725806	.901639	.918033	1.163636	.875000	1.018182	1.347826	.983333	.769231

TABLE OF LAMBDA VALUES FOR STATION 14607

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.030000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.333333	.000000	.000000	.222222	.125000	.000000	.062500	.166667	.047619	.000000
.30	1	.083333	.166667	.090909	.071429	.391304	.250000	.411765	.150000	.064516	.272727	.156250	.071429
.40	1	.260870	.294118	.050000	.162162	.548387	.242424	.307692	.192308	.125000	.340909	.390244	.400000
.50	1	.352941	.360000	.133333	.166667	.657143	.348837	.242424	.186047	.304348	.461538	.673469	.487179
.60	1	.346939	.485714	.243902	.272727	.622222	.416667	.365854	.288462	.411765	.543860	.714286	.488085
.70	1	.491525	.565217	.384615	.413793	.618182	.611111	.440000	.396552	.553571	.569231	.883333	.784314
.80	1	.621212	.711538	.745455	.555556	.836066	.945455	.666667	.532258	.616667	.695652	1.032258	.864407
.90	1	.928571	.931034	.825397	.833333	1.064516	.893939	.965517	.703125	.642857	.970588	1.106061	1.049180
1.00	1	1.231884	1.078125	1.084507	1.215385	1.387097	1.058824	1.142857	.869565	.710526	1.084957	1.289855	1.426230

TABLE OF LAMBDA VALUES FOR STATION 14732

PLO	1	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.166667	.000000	.000000	.000000	.000000	.000000	.250000	.000000	.000000
.20	1	.466667	.071429	.312500	.153846	.307692	.000000	.333333	.000000	.285714	.307692	.133333	.133333
.30	1	.541667	.125000	.347826	.400000	.428571	.125000	.250000	.166667	.300000	.315789	.142857	.318182
.40	1	.653846	.133333	.357143	.400000	.588235	.100000	.363636	.277778	.375000	.409091	.192308	.478261
.50	1	.687500	.176471	.533333	.571429	.521739	.166667	.416667	.400000	.529412	.500000	.400000	.424242
.60	1	.714286	.250000	.645161	.545455	.560000	.238095	.352941	.360000	.434783	.640000	.441176	.583333
.70	1	.666667	.405405	.774194	.575758	.625000	.480000	.384615	.433333	.518519	.730769	.486486	.500000
.80	1	.790698	.589744	.935484	.685714	.621622	.678571	.468750	.617647	.870968	.705882	.648649	.604651
.90	1	.931818	.619048	1.030303	.675000	.725000	.750000	.589744	.750000	1.057143	1.000000	.850000	.717391
1.00	1	1.068182	1.050000	1.281250	.928571	1.073171	.975610	1.025641	.900000	1.105263	1.742857	1.000000	.847826

TABLE OF LAMBDA VALUES FOR STATION 14739

PLO	1	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.166667	.000000	.000000	.000000	.000000	.000000	.400000	.111111	.000000
.20	1	.529412	.000000	.083333	.157895	.071429	.125000	.000000	.428571	.000000	.571429	.217391	.304348
.30	1	.437500	.151515	.157895	.250000	.260870	.263158	.166667	.277778	.333333	.517241	.323529	.393939
.40	1	.380952	.289474	.306122	.342857	.323529	.444444	.166667	.285714	.379310	.638889	.571429	.439024
.50	1	.365385	.333333	.339286	.463415	.357143	.531250	.437500	.333333	.315789	.707317	.687500	.489796
.60	1	.403774	.423077	.508475	.488889	.404255	.611111	.475000	.400000	.609756	.708333	.781818	.603774
.70	1	.600000	.450000	.600000	.500000	.520000	.604651	.555556	.408163	.659574	.764706	.857143	.603448
.80	1	.582090	.539683	.727273	.551724	.666667	.788462	.648148	.518519	.840000	.833333	.948276	.661290
.90	1	.714286	.712121	.808824	.830508	.737705	.896552	.859649	.677419	1.054546	.816667	1.032258	.787879
1.00	1	.716216	.913043	1.000000	.934426	1.133333	1.131148	1.046154	.746479	1.177419	.969231	1.090909	.985294

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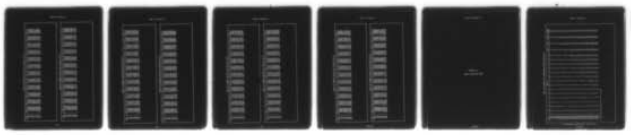

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TABLE OF LAMBDA VALUES FOR STATION 14847

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.142857	.166667	.000000	.333333
.30	1	.250000	.166667	.000000	.210526	.000000	.100000	.166667	.090909	.250000	.272727	.230769	.500000
.40	1	.333333	.090909	.250000	.375000	.000000	.250000	.117647	.125000	.263158	.352941	.500000	.529412
.50	1	.454545	.058824	.250000	.518519	.115385	.300000	.181818	.130435	.333333	.333333	.500000	.407407
.60	1	.653846	.208333	.222222	.516129	.212121	.454545	.240000	.129032	.346154	.370370	.466667	.483871
.70	1	.781250	.290323	.206897	.500000	.378378	.517241	.277778	.216216	.393939	.785714	.757576	.500000
.80	1	.805556	.606061	.500000	.600000	.540541	.696970	.512821	.428571	.583333	1.000000	.736842	.850000
.90	1	1.000000	.783784	1.114286	.815789	.642857	.694444	.555556	.533333	.731707	1.310345	1.025641	.886364
1.00	1	1.268293	1.323529	1.307692	1.076923	.782609	.961220	.875000	.666667	.800000	1.586207	1.410256	1.227273

TABLE OF LAMBDA VALUES FOR STATION 23174

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.30	1	.000000	.750000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.500000
.40	1	.000000	1.000000	.000000	.000000	.000000	.500000	.000000	.000000	.000000	.000000	.000000	.750000
.50	1	.428571	1.000000	.000000	.000000	.500000	.250000	.000000	.000000	.500000	.000000	.000000	.666667
.60	1	.666667	.857143	.000000	.500000	.285714	.600000	1.000000	.000000	.333333	.428571	.125000	.625000
.70	1	.727273	.750000	.285714	.285714	.428571	.857143	.666667	.500000	.750000	.300000	.181818	.700000
.80	1	.750000	.909091	.375000	.272727	.636364	1.200000	.600000	.800000	.428571	.538462	.230769	.818182
.90	1	.750000	1.545455	.384615	.357143	.714286	1.214286	1.166667	.800000	.700000	.647059	.600000	.733333
1.00	1	1.000000	2.545455	.550000	1.125000	1.375000	2.642857	2.153846	1.312500	1.714286	1.526316	1.538462	1.266667

TABLE OF LAMBDA VALUES FOR STATION 24233

PLO	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.333333	.000000	.000000	.666667	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.30	1	.227273	.055556	.090909	.100000	.250000	.250000	.000000	.142857	.000000	.136364	.291667	.277778
.40	1	.348837	.187500	.074074	.210526	.214286	.272727	.111111	.285714	.208333	.329329	.285714	.305556
.50	1	.400000	.372093	.405405	.290323	.296296	.370370	.142857	.275862	.361111	.294118	.433962	.363636
.60	1	.500000	.553191	.541667	.400000	.461538	.323529	.300000	.358974	.409091	.410714	.656172	.500000
.70	1	.628000	.860000	.660714	.653061	.530612	.575000	.461538	.595455	.580000	.589615	.903226	.671429
.80	1	1.013699	1.240000	.784615	.829561	.690909	.787234	.727273	.764706	.750000	.823529	1.145161	.993662
.90	1	1.191781	1.452830	1.000000	1.175439	.868852	.966102	.869925	1.074074	1.037736	1.134328	1.208955	1.081081
1.00	1	1.558824	1.811321	1.382353	1.327869	1.090909	1.349206	1.375000	1.500000	1.114754	1.323529	1.523077	1.303562

TABLE OF LAMBDA VALUES FOR STATION 13743

PLO	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.333333	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.230769	.000000	.058824	.333333	.000000	.000000	.000000	.000000	.222222	.000000	.041667	.266667
.30	1	.185185	.235294	.300000	.304348	.210526	.166667	.000000	.000000	.294118	.080000	.058824	.296296
.40	1	.255814	.232558	.394737	.517241	.346154	.227273	.000000	.125000	.545455	.250000	.170732	.406250
.50	1	.300000	.264151	.488372	.542857	.433333	.370370	.083333	.333333	.642857	.358974	.260000	.511628
.60	1	.333333	.355932	.555556	.666667	.384615	.375000	.142857	.406250	.588235	.386364	.259259	.620000
.70	1	.486140	.466667	.527273	.739130	.444444	.452381	.317073	.461538	.731707	.464286	.431034	.696429
.80	1	.634921	.622951	.729138	.686185	.600000	.560000	.562500	.529412	.829787	.699115	.538462	.692308
.90	1	.676471	.651515	.796875	.918033	.593750	.629032	.905660	.733333	.980769	.935484	.686567	.923077
1.00	1	.685714	.739130	.970588	1.044118	1.046875	1.000000	1.316789	.909091	1.032258	1.179403	.830986	1.190476

TABLE OF LAMBDA VALUES FOR STATION 13983

PLO	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.250000	.100000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.250000	.000000
.20	1	.357143	.117647	.550000	.083333	.000000	.000000	.000000	.000000	.000000	.000000	.250000	.117647
.30	1	.615385	.200000	.607143	.300000	.250000	.142857	.250000	.000000	.000000	.312500	.190476	.416667
.40	1	.525000	.365854	.750000	.354839	.166667	.181818	.100000	.083333	.100000	.321429	.303030	.456250
.50	1	.612245	.533333	.707317	.375000	.259259	.315789	.210526	.111111	.260870	.424242	.625000	.939394
.60	1	.777778	.604167	.750000	.448085	.388889	.275862	.400000	.125000	.297297	.555556	.857143	1.105263
.70	1	.864907	.764706	.679245	.442963	.511628	.358974	.342105	.147059	.477273	.627907	.854167	1.000000
.80	1	1.120490	.867925	.888889	.616667	.685185	.489796	.413043	.209302	.630435	.739130	.736842	1.183673
.90	1	1.275862	1.000000	1.000000	.709677	.842105	.614035	.472727	.537037	.820000	.940000	.870968	1.207547
1.00	1	1.333333	1.175439	1.229508	.969697	.968750	1.155172	.820896	.898305	1.087719	1.052632	1.015152	1.315789

TABLE OF LAMBDA VALUES FOR STATION 23154

PLO	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.30	1	.666667	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.166667
.40	1	.428571	.166667	.000000	.000000	.000000	.250000	.000000	.000000	.000000	.090909	.100000	.166667
.50	1	.250000	.416667	.055556	.076923	.200000	.285714	.000000	.000000	.000000	.142857	.312500	.250000
.60	1	.225806	.384615	.260870	.217391	.296296	.266667	.000000	.333333	.150000	.200000	.200000	.375000
.70	1	.421053	.275000	.264706	.454545	.485714	.650000	.130435	.380952	.240000	.444444	.387097	.633333
.80	1	.586957	.400000	.384615	.590909	.727273	.900000	.300000	.617647	.363636	.621622	.534884	1.000000
.90	1	.857143	.924528	.890909	.882353	1.060000	1.095238	1.232558	.847826	.510638	.733333	.627451	.916667
1.00	1	1.213115	1.293103	1.362069	1.333333	1.438596	1.440000	2.044444	1.450980	1.207547	1.076923	.822581	1.052632

TABLE OF LAMBDA VALUES FOR STATION 24225

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.250000
.30	1	.066667	.222222	.000000	.000000	.000000	.000000	.000000	.000000	.166667	.000000	.307692	.133333
.40	1	.225806	.222222	.187500	.000000	.000000	.000000	.000000	.250000	.375000	.000000	.444444	.269231
.50	1	.525000	.517241	.250000	.000000	.095238	.071429	.166667	.200000	.545455	.333333	.487805	.291667
.60	1	.588235	.512821	.487805	.103448	.235294	.285714	.300000	.250000	.625000	.666667	.500000	.784314
.70	1	.819672	.638298	.740000	.365854	.500000	.440600	.312500	.500000	.692308	.764706	.689655	1.071429
.80	1	1.140625	.842105	.941941	.653846	.795918	.656250	.285714	.368421	.727273	.857143	1.137931	1.380877
.90	1	1.406250	1.400000	1.166667	.813559	.888889	1.000000	.359839	.655172	.833333	1.145833	1.482759	1.748485
1.00	1	1.651515	1.625000	1.637931	1.456140	1.357143	1.100000	1.074074	1.367347	1.173913	1.580000	1.925926	2.479167

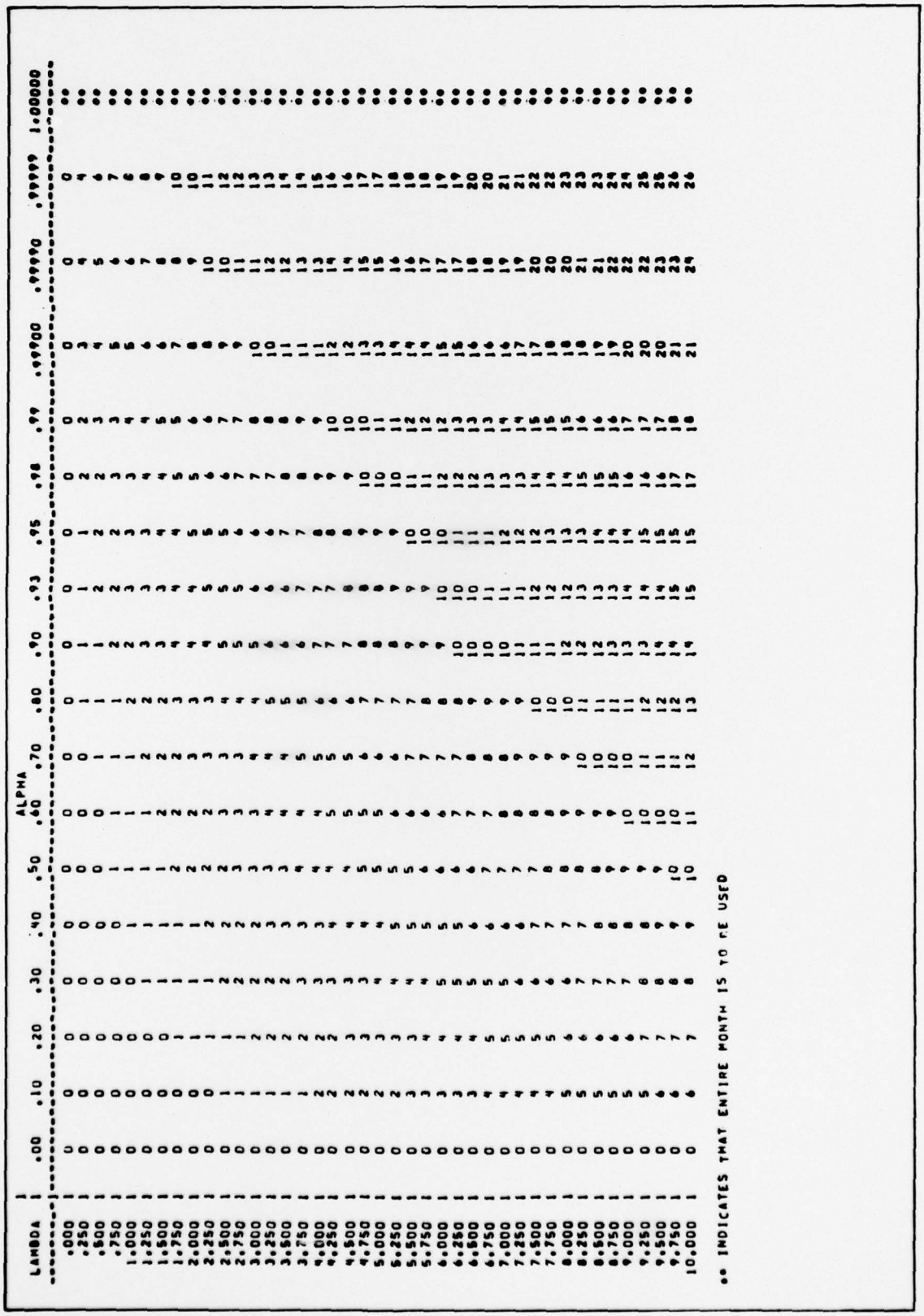
TABLE OF LAMBDA VALUES FOR STATION 93193

PLG	I	MONTH 01	MONTH 02	MONTH 03	MONTH 04	MONTH 05	MONTH 06	MONTH 07	MONTH 08	MONTH 09	MONTH 10	MONTH 11	MONTH 12
.00	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.10	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000
.20	1	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.400000
.30	1	.300000	.222222	.142857	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.100000	.705882
.40	1	.555556	.333333	.222222	.000000	.000000	.000000	.000000	.000000	.000000	.000000	.166667	.913043
.50	1	.666667	.363636	.214286	.214286	.200000	.000000	.000000	.000000	.000000	.222222	.260870	.941176
.60	1	.772727	.756757	.185185	.450000	.166667	.000000	.000000	.000000	.166667	.363636	.384615	1.209474
.70	1	.960000	1.028571	.307692	.521739	.153846	.125000	.200000	.000000	.090909	.555556	.531250	1.375000
.80	1	1.035714	1.153846	.458333	.821429	.343750	.071429	.538462	.307692	.285714	.625000	.525000	1.382979
.90	1	1.321429	1.295455	.826923	.777778	.556140	1.111111	1.818182	1.148148	.933333	.717949	.790698	1.571429
1.00	1	1.327869	1.714286	1.321429	1.500000	1.200000	5.478261	8.235294	3.189189	3.333333	1.370370	1.109091	2.127660

APPENDIX D

WORST CASE DAYS TABLE

TABLE OF NUMBERS OF SEQUENTIAL WORST CASE DAYS



*U.S. GOVERNMENT PRINTING OFFICE: 1977-701-784/213